February 8, 1943

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

ESTABLISHED 1882

VALLEY MOULD & IRON CORP

General Office: HUBBARD, OHIO

Western Office: Chicago, Ill.

. . But his customer got the Gauges in time!

Recently a Purchasing Agent handed a Distributor's salesman an order for a set of Gauges—normally a stock item with any well-equipped Jobber.

But the local factories are loaded up with precision work—first it seemed Gauges would be hard to find, finally the salesman admitted none were to be had.

"We haven't quit trying," he reminded the P. A.—from his own office he called a responsible manufacturer 600 miles away. "Yes," replied the Gauge man, "we have some of those sizes and will ship today."

When the Distributor billed the job, he added $6.00 normal gross profit. Then he paid the Telephone Company a $4.00 toll, leaving $2.00 for himself. Still he feels he is away ahead because one of his standard policies is to say "thanks—sure we'll take care of you on every order."

You like to do business with firms like that and so do we. Years ago we began appointing them *our* Distributors—and *your* close-at-hand source of supply for Cle-Forge High-Speed Drills and Peerless High-Speed Reamers throughout Industrial America.

This incident is typical of the unusual services that many Mill Supply Distributors are rendering their customers during the Emergency.

ARMY NAVY

Awarded May 22, 1942
Superseded July 13, 1942

The CLEVELAND TWIST DRILL COMPANY
1242 EAST 49th STREET
CLEVELAND

TRADE MARK REG. U. S. PAT. OFF. AND FOREIGN COUNTRIES

50 READE ST. NEW YORK · 9 NORTH JEFFERSON ST. CHICAGO · 630 HOWARD ST. SAN FRANCISCO
6818 SECOND BLVD. DETROIT · LONDON - E. P. BARRUS, LTD. - 23-36-37 UPPER THAMES ST., E.C.4

ARMY E NAVY

Awarded August 8, 1942

"CLEVELAND" DISTRIBUTORS EVERYWHERE ARE READY TO SERVE YOU

LOGY

SAFE WAYS IN WAR PRODUCTION

NEW WORKER—Every new employee in a Bethlehem Plant wears this button. It helps to fix his attention on safety. It signals to more experienced employees that he is new to the plant, and they keep an eye on him, and do not hesitate to offer friendly guidance in case he forgets instructions and unknowingly breaks any safety regulation.

Industrial accidents, bad enough because of the human distress they cause, are also a grievous drag on production. Every day that injury lays up a worker means lowered output of the materials our armed forces are asking for.

Safety engineers know they must be more than ever on guard as pressure for production intensifies and men work against time. When war came, Bethlehem Steel Company expanded its accident-prevention program to meet the new conditions. Special efforts were addressed to the new employee to make him safety-conscious from the moment he walked into the plant. And by posters, group meetings and individual instruction, the safe way of doing his job was ground into the subconscious of new Bethlehem employee and veteran alike.

Significant are the results of a current study, showing that of all disabling accidents to Bethlehem employees less than one-third occur in the course of their work. Even with employment rolls upped by the tens of thousands and plant operations at top speed to meet the demands of the war program, the Bethlehem employee is safest, best protected against injury, during the hours he spends on the job.

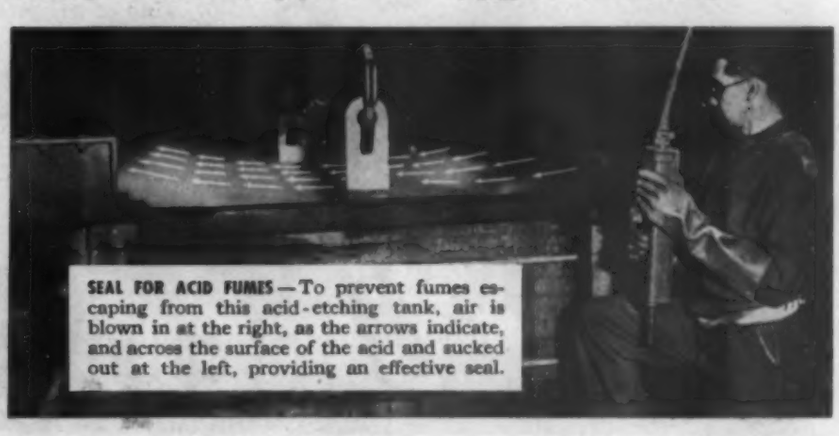
AUTOMATIC HAND GUARD—This man is operating a trimming press. If he should absent-mindedly let his hands move too near the danger zone, the two cables will automatically whisk them back to safety, before the ram of the press descends.

100% HEAT-INSULATED—Asbestos-covered hood, chrome-leather full-length apron, chrome-leather gloves, chrome-leather full-length sleeves and asbestos guard on torch handle give this worker complete protection against heat and flying sparks.

EYES DOUBLY GUARDED—Even though this grinder is equipped with a heavy glass shield, the eyes of the man who is operating it are given further protection against sparks or flying bits of abrasive by the cup goggles that he is wearing.

BETHLEHEM STEEL

Bethlehem Steel Company is actively supporting the National Safety Council in its campaign against accidents in war production, through the War Production Fund to Conserve Manpower.



SEAL FOR ACID FUMES—To prevent fumes escaping from this acid-etching tank, air is blown in at the right, as the arrows indicate, and across the surface of the acid and sucked out at the left, providing an effective seal.

1 ADAPTABILITY TO MORE TYPES OF WORK

Exceptional range of conditioning due to variation of roll angle (10 to 35) which varies the work cycle per unit of length of the work piece.

2 GREATER RANGE OF OUTPUT SPEEDS

Through-put speeds of 50 to 1000 F.P.M. simply by varying roll angularity and by varying the gear arrangement which is *built into the machine.*

3 TAKES UP LESS FLOOR SPACE

No space taking projections or extensions. Medart's Universal 2 & 2 is more compact and takes less floor space.

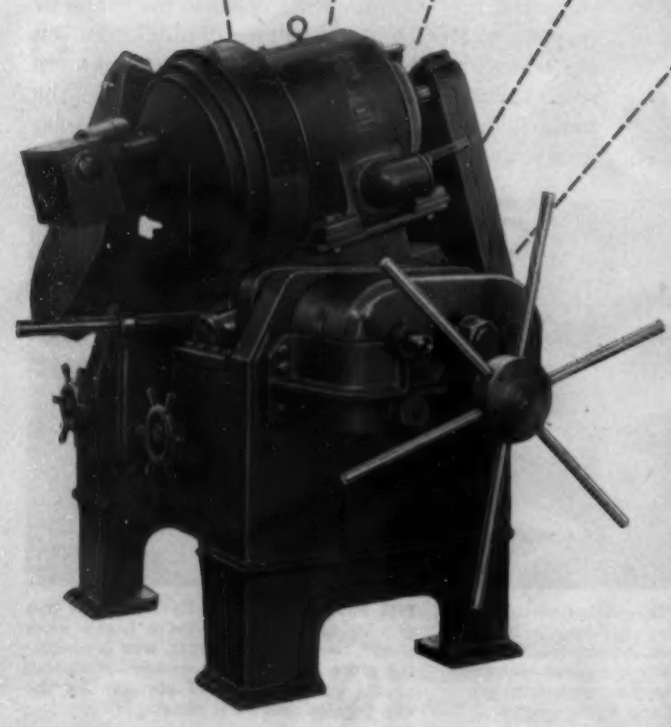
4 MINIMUM OF WORKING PARTS

Simplified operation requires no special operating or maintenance skill, no universal joints, no bevel gears, no separate gear reduction unit.

5 MECHANISM IS ABOVE THE ROLLS

Machine can be used on scaled, rusty or dirty work pieces. This also permits free use of circulating or polishing fluid if needed.

FIVE POINTS OF SUPERIORITY!



the new MEDART 2 & 2 UNIVERSAL { 2 ROLLS AND 2 MOTORS

bar and tube straightening . . . sizing . . . polishing machines

For high speed, precision production... Medart's new 2 & 2 Universal gets the call among bar and tube machines. Similar in operating principle to the Standard Medart 2 Roll Machine, has same patented concave and straight roll arrangement. Difference is, each roll *with its individual driving motor and reduction gearing* is an integral unit. Work piece ranges 1/16 inch to 6 in diameter capacities.

Only Medart presents a complete, proven line of all-purpose bar and tube machines

Manufacturing Engineers of Complete Transmission Equipment and Specialized Machinery

MEDART

THE MEDART COMPANY
3500 DE KALB ST., ST. LOUIS, MO.

MACKLIN
GRINDING WHEELS

There is a MACKLIN wheel for every grinding job. If you are having any grinding difficulty call for a MACKLIN Field Engineer—no obligation.

THANKS! FOR PUTTING US STRAIGHT ON THAT GRINDING JOB— AND FOR RESPONDING SO QUICKLY TO OUR WIRE FOR ASSISTANCE
THAT'S MY JOB "PROTECT YOUR PRODUCTION"
MACKLIN FIELD ENGINEER

MACKLIN COMPANY

Manufacturers of GRINDING WHEELS — JACKSON, MICHIGAN, U. S. A.

Distributors in all principal cities

Sales Offices: — Chicago - New York - Detroit - Pittsburgh - Cleveland - Cincinnati - Milwaukee - Philadelphia

BEHIND THE SCENES

The Editors' Roundtable

■ *Erle Ross, who extols the industrial position of Chicago in this week's Roundtable, came with* STEEL *twenty-four years ago after having been graduated in electrical engineering from Purdue University and having worked a few years in the construction and power generating industries. He was engineering editor of* STEEL, *when in 1940 the need for an experienced editor in the Chicago territory led to his transfer there as Resident Editor. If you're in or around the windy city and something comes up where you need some information or special service in a hurry,* STEEL'S *office is at 520 North Michigan avenue and you'll find Erle Ross more than willing to do everything he possibly can.*

E. F. Ross
Chicago Editor

Prospects are that after the war is won the Chicago area will hold a relatively more important position as a producer and consumer of iron, steel and metals than it enjoyed in prewar days. This can be ascribed to a number of basic factors as well as certain defense-born developments.

At present, this district has a steel ingot capacity of 16,899,160 net tons, or nearly one-fifth of the nation's total. Some minor expansion is under way. During 1942, Chicago weekly steelmaking operations topped all other districts with an average of 102.8 per cent. Second was Pittsburgh with 95.6 per cent, and country as a whole was 98.1 per cent.

In pig iron, the Chicago area has 12,954,800 tons, or 21.4 per cent, of United States capacity, and in 1942 produced 21.2 per cent of the nation's output. It is second only to the Pittsburgh-Youngstown district with 40 per cent of total capacity and which made 41 per cent of the 1942 output. Two new blast furnaces will be completed in Chicago this year.

Industrial facilities in the Chicago area experienced a phenomenal growth in 1942, a total of $569,535,000 having been invested in plants and equipment. This represented the greatest forward step in plant development of any year in history. Volume of plant construction, exclusive of military, since beginning of the defense program in mid-1940 has been $819,227,000.

Much of the new construction has been in the metalworking industry and is related to aircraft, tanks, ordnance and ammunition. It is expected that a substantial portion of the facilities will be continued in operation after the war's end, while some of the balance will be converted to metal products for peacetime.

Chicago's rise as a producing center has been due to its favorable access to raw materials, its central location, and its excellent rail and water transportation. It is not wild speculation, therefore, that the area will retain its improved position, even though partially war inspired.

Very ApPROPriate

■ Literally hundreds of new plant papers are now rolling off the presses, bringing to war production workers the news of activity within their own plants and also of how their products is filling the bill on the battlefront. Naming a paper of this sort is no simple task, and some of them strain pretty hard for a suitable monicker. One of the best we've seen is the sheet published by American Propeller Corp., Toledo, O., and called *Vox Prop.* Of course, nothing yet has ever approached the Modern Collet & Machine Co.'s house organ up in Detroit which carries on under the classical name of *Wha-Cha-Ma-Collet!*

The Mail Bag

■ Let's take a peek at the mail this week and (to coin a phrase) see what's cookin'.

H. G. Cox, Buyer, A. B. Chance Co., Centralia, Missouri writes:

STEEL is now passed all through the plant and we find it is very interesting and very helpful, and I would like to add that I personally greatly appreciate and always use your section on priorities, allocations and prices.

Leon Henderson, now vacationing in Havana, writes E. C. Kreutzberg as follows:

Your letter of December 19 is very heartening, and I appreciate a lot your kind words and generous appraisal. Feeling as you do, you can do me no greater personal favor than to continue to back, not only the policies of the Office of Price Administration under Prentiss Brown, but also the magnificent work being done in every community in the country by the local "Committees of Neighbors". These boards are doing a great and unselfish service, and if we succeed in this battle against inflation, the major credit will go to them.

As we've mentioned before STEEL is being used as a direct source of information by top men all through WPB, OPA and district ordnance offices. This week Frank A. Weidman, Chief, Maintenance & Repair Section, Steel Division, WPB writes:

I assure you I have occasion frequently to turn to STEEL for information. It enables me to keep in touch with what is happening in industry, which is always useful, interesting and necessary.

The Birmingham District Ordnance office writes:

STEEL is circulated in the office and it can be said that very valuable information is often gleaned from the contents by the officers and civilian personnel.

And another letter in from the Ordnance Ammunition Production Office at Wilmington, Del.

All the engineers assigned to this office read STEEL and it is looked upon as having a great deal of up-to-date and interesting information.

Too Good To Last

■ Everything seems to have been on a high level this week because try as we might the only critical or controversial letter to be found was from a good subscriber over near Toledo still wanting us to return a photograph for which we have already twice turned the whole office inside-out and had some very nasty remarks tossed at us. Maybe next week someone will bawl us out good and proper for not reporting all the gory details of the Errol Flynn trial in this complete wartime information service called STEEL, and then we'll really have something to go to work on.

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Editorial Contents—Page 45

There's Nothing New in Women Running Turret Lathes

Machine Accuracy Compensates for Inexperience

A QUARTER of a century ago, during the first world war, many women took the places of men at turret lathes. Then, Warner & Swasey employed scores of women as turret lathe operators. In England, thousands of women have worked at machine tools since the start of the war. Now, in America, as more and more men are called into armed services, women are again taking their places in the ranks of machine tool operators.

Under supervision and with aid in chucking heavy parts, women are fully capable of producing good work on Warner & Swasey Turret Lathes. *The extra capacity and greater accuracy built into modern Warner & Swaseys compensate to a large extent for inexperience and lack of finished mechanical skill.* Controls are conveniently located and much of the turning job is automatic.

Women can not be expected to fill the shoes of expert machinists, but for the repetitive operations required to produce vital war production, women can be trained quickly to operate Warner & Swaseys with surprising speed and precision.

WARNER & SWASEY FOR VICTORY

YOU CAN TURN IT BETTER, FASTER, FOR LESS... WITH A WARNER & SWASEY

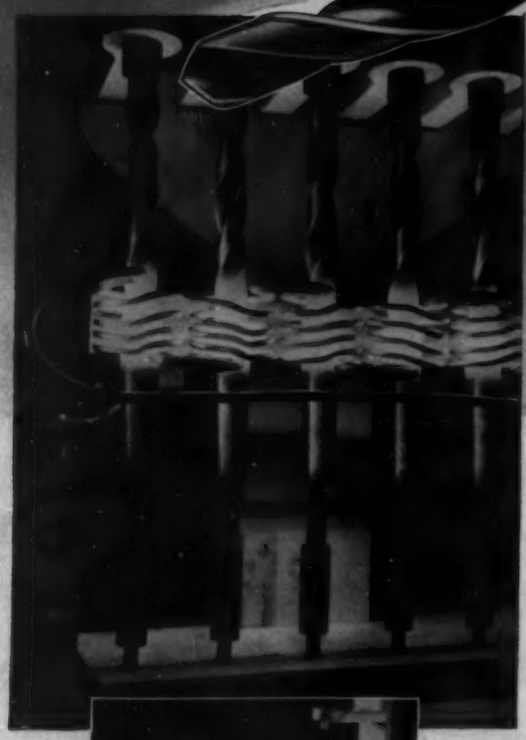
New Republic Method

FOR MAKING TWIST DRILLS USING

Lepel

HIGH FREQUENCY

INDUCTION HEATING



By replacing conventional welding methods with modern high frequency induction brazing, the Republic Drill & Tool Company, Chicago, Ill., have made an outstanding contribution to the efficient manufacture of twist drills. Photo at left shows the new Republic gang-brazing set-up for joining shanks and high speed drill barrels, on the larger size drills, by LEPEL induction heating. A special high temperature compound is used wherein the brazing action occurs at 1800° F., thus eliminating all danger of separation in high temperature service. This development permits high production machining of the shanks, and heat treatment of the fluted sections, *before* rather than after assembly. The advantages, the economy, the added efficiency . . . all are obvious.

Photos to left show gang-brazing department at Republic, with battery of compact, efficient LEPEL induction heating units; also, female operator quickly brazing a shank to one of the 'long ones' at Republic.

Whether your production problem involves BRAZING, SOLDERING, LOCALIZED HARDENING, ANNEALING, BOMBARDING or MELTING, LEPEL High Frequency Induction Heating in all probability can *greatly expand your output—reduce rejects to a negligible quantity—solve your skilled worker problem*—and *cut costs appreciably*. LEPEL Engineers will gladly and promptly submit facts and figures—based on your own work—if you will acquaint them with your problems. Write or wire today.

Lepel HIGH FREQUENCY LABORATORIES, INC.

39 West 60th Street, New York, N. Y.

PIONEERS IN INDUCTION HEATING

To the Skeptic who hasn't yet tried the POR-OS-WAY WHEEL

THE MEN in the armed forces want all you can give them—NOW! You may, as hundreds of war plants have already proved, increase your precision grinding production 2 to 5 times per man per machine with the Por-os-way wheel. Try it!

A YEAR AGO we introduced to industry a new precision grinding wheel. We were confident, after three years' research and scores of actual trials on production work that this new wheel, Por-os-way, would produce 2 to 5 times more work per man per machine. And we said so. At first there were few believers. Our statement seemed incredible. But there was a war to be won. War plants by the score tried Por-os-way, probably with more hope than conviction. They did not fully realize, then, that Por-os-way, being an entirely new kind of wheel, could not be limited by comparison with wheels they had been using.

But skepticism is disappearing. Many operators now *know* that Por-os-way's patented honeycombed structure cools each grinding point between contacts, practically eliminating "burns" in vital war work. Many know that they can double or treble the depth of former cuts and grind in fewer passes of the wheel . . . have seen how the Por-os-way wheel holds its corner and resists "loading", reducing the number of dressings necessary. Many have proved to their own satisfaction that the life of a Por-os-way wheel is at least equal to or better than previous wheels, and know that Por-os-way can produce 2 to 5 times more work per man per machine. But even among Por-os-way's most enthusiastic users, some few are *still not pushing Por-os-way to the limit of its possibilities.* We want you to give this wheel "the whole works." We want you to see for yourself it is all others say it is. Send for "Facts about Por-os-way", with a "prescription blank" for a trial, run to your requirements.

2 TO 5 TIMES MORE WAR PRODUCTION PER MAN PER MACHINE

War plants say, "Tell others what Por-os-way has done for us."

WAR PLANT A—Job: Surfacing oil-hardened, high-speed steel blanks on B & S grinder at 6200 SFPM.

Results: Por-os-way removed .050" in one pass, against .020" previously. Por-os-way wheel lasted 2½ times as long as former wheel, required no dressing, produced no burn, held shape and corner while grinding.

WAR PLANT B—Job: Grinding high-speed cutter tool steel on LeBlond No. 1 at 4750 R.P.M.

Results: Por-os-way increased production 300%. Held a true edge in grinding a *complete* gear cutter. No burning, no loading. Free, cool cutting without dressing. Good finish.

WAR PLANT C—Job: Internal wet grinding on Bryant 16-A machine at 8946 R. P. M. on hardened tool steel—SAE 41/50. Precision grinding.

Results: Obtained 400% better production. Cut fast, free, and cool. Diamond dressed only occasionally to retain shape.

POR-OS-WAY*
a new RADIAC* PRODUCT

A. P. DE SANNO & SON, INC.
NEW YORK, CHICAGO, PITTSBURGH, CLEVELAND, DETROIT, LOS ANGELES

PHOENIXVILLE, PENNA.
Western Gateway to VALLEY FORGE

*T. M. Reg. U. S. Pat. Off.

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LEWIS

Up and Down cut SHEAR

LEAVES THE SLAB STRAIGHT AND TRUE AFTER CROPPING

This new 1350-ton Lewis Heavy Duty Cold Slab Shear is saving time on the Victory Program.

LEADING FEATURES

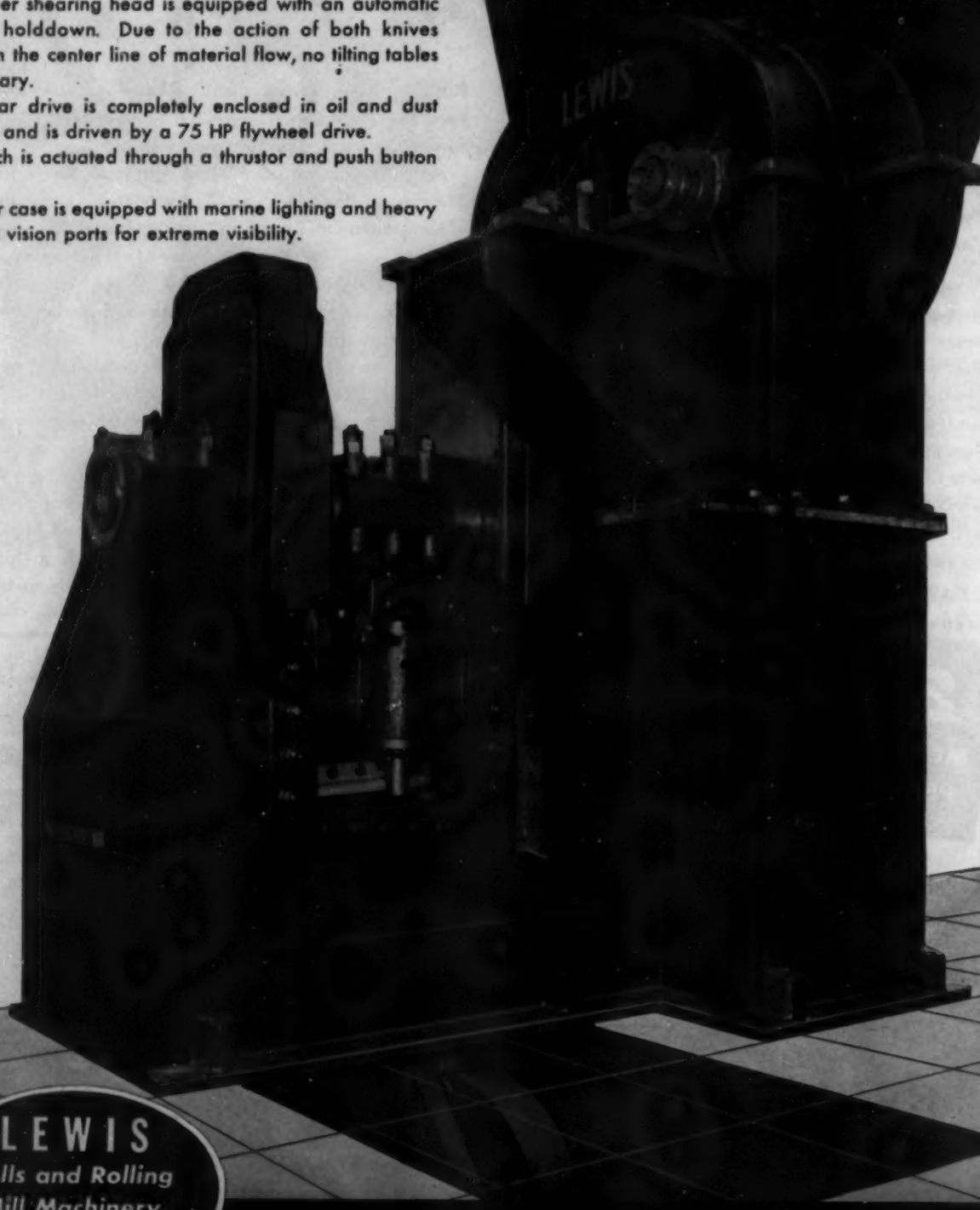
This shear is designed to crop 3" x 25" slabs. Both upper and lower knives function in vertical slides eliminating oscillation of the main cutting frame and assuring a true cut and straight slab after cropping.

The upper shearing head is equipped with an automatic hydraulic holddown. Due to the action of both knives meeting on the center line of material flow, no tilting tables are necessary.

The shear drive is completely enclosed in oil and dust tight cases and is driven by a 75 HP flywheel drive.

The clutch is actuated through a thrustor and push button control.

The gear case is equipped with marine lighting and heavy plate glass vision ports for extreme visibility.



LEWIS
Rolls and Rolling Mill Machinery
step up tonnage

LEWIS FOUNDRY & MACHINE
DIVISION OF BLAW-KNOX CO.
PITTSBURGH, PA.

and a tough material is in their "innards"

ArmaSteel*

It takes more than fire-power and a tough hide of steel to make these blasting behemoths an effective spearhead. They need tough "innards" to keep them on the move.

Vital engine and transmission parts of ArmaSteel are helping safeguard the mobility of American tanks. ArmaSteel parts have been through their baptism of fire, and have come out with a reputation for exceptional ruggedness, resistance to wear, and ability to withstand shock.

In varied applications where ArmaSteel castings have replaced critical steels and alloys, they have effected a substantial saving in machining time and tool wear, with a corresponding increase in production. Give us your problem, and let us work out the possibilities of using ArmaSteel to obtain the required performance characteristics.

*Reg. U. S. Pat. Off.

SAGINAW MALLEABLE IRON DIVISION
General Motors Corporation, Saginaw, Michigan

CAST FOR A LEADING ROLE IN INDUSTRY

NO WAR, EVER BEFORE, SAW SHIPS BUILT IN 6 DAYS

...*nor* the modern *Preformed wire rope*

THAT LIFTS AND SWINGS THEIR PARTS INTO PLACE

New to this war—the ship-building speed records being shattered from day to day.

New to this war, too—the Preformed Wire Rope which is playing such a giant role in the ship-building program; *new to this war*—though tested and proved through years of peacetime production, as if in preparation for the tough wartime tasks ahead.

Tested and proved stronger, longer lasting, more flexible, more easily handled—cutting shutdowns, cutting accidents, cutting costs—Preformed Wire Rope is doing a *front-line* job on hundreds of assignments in ship-building, as well as maintaining its *home-front* job in industry.

Ask your own wire rope manufacturer or supplier

EVERY SUB COMMANDER
KNOWS THE IMPORTANCE OF

Centralized Control

Instant response — unfailing action in every mechanical element of the ship — is vital to protect the lives of the crew as well as giving striking power to the submarine. From his station, the commander skillfully directs its performance through centralized control equipment.

★ ★ ★

The centralized controls of Milwaukee Milling Machines give the operator complete command of his machine — enable him to control its performance to the fine degree he demands for the full expression of his skill.

Speed and feed dials — all control levers within easy reach — the latter duplicated front and rear on plain and universal horizontal machines (model 2K and larger) — contribute to the sustained precision of Milwaukees, in the tool room or on the production line.

KEARNEY & TRECKER
CORPORATION
MILWAUKEE, WISCONSIN

Buy Victory with at least 10% in War Bonds!

Milwaukee MACHINE TOOLS

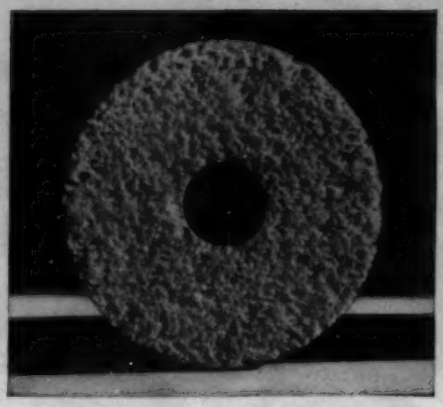
Which Wheel Structure for YOUR Job . . . *Dense, Medium, Open ?*

MOST ordinary tool and cutter jobs and surfacing jobs require either the fairly dense No. 5 structure or the medium No. 8 structure, the choice being dependent on the size and shape of the tool or part and the area of contact. There are jobs however where the Norton very open, No. 12, structure (illustrated) will be found best, such as:

(1) Surface grinding with periphery of wheel of hard, heat-sensitive steels.

(2) Hob grinding, especially when heavy cuts must be taken.

(3) Form tools or other grinding where accurate contours are required, except where acute included angles are involved. (Structure No. 12 wheels, because of their large pores, should not be trued to a sharp, thin point.)



No. 12 Structure (Open)

Norton engineers will be glad to study your toolroom and surfacing jobs and select the wheel structure which will be best for each one.

NORTON COMPANY, WORCESTER, MASS.

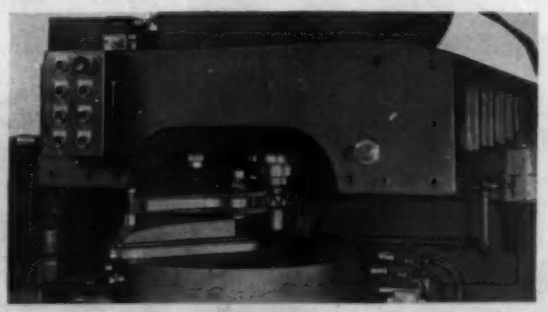
W-899

Big DAVIS & THOMPSON Roto-matics FULLY AUTOMATIC

Speed Up VICTORY PRODUCTION

Here is another unique example of how Davis & Thompson specially designed automatic machines combine sensational production speed with finest precision to assure the safest fighting planes and best of battle weapons to hasten Victory:

This D&T high production machine has a 34" rotary table (hydraulically operated by oil motor) mounted on a sliding table of 44" movement (driven by another oil motor actuating a screw), with vertical spindle head for feed or rapid traverse forward or reverse (run by a third oil motor, through a screw).



In approximately 20 steps, automatically actuated by solenoid valve controlled limit-switches, the machine completes all the intricate rough- or finish-milling of the channel operations on connecting rods for aircraft engines . . . with speed that cuts time to a fraction of former methods . . . with uniform precision . . . conserving vital metal by reducing rejections . . . saving manpower by automatic operations, completing either job on a single setup, and simplifying inspections.

In war or peacetime, Davis & Thompson engineers boost production and cut costs with specially designed machines. You will find this organization well qualified and equipped to analyze your production and to speed output.

Write for copy of the "Victory Production" book.

DAVIS & THOMPSON CO., Milwaukee, Wis., U. S. A.

Buy **WAR BONDS** *and* **STAMPS**

D&T ROTO-MATIC HIGH PRODUCTION MACHINERY

APPLICATION

Mfr. SCHLOEMANN ENG'G CORP.

Appli. SCALE TABLE "MOTOR-ROLLERS"

SKF Bearings and Pillow Blocks. An SKF Cylindrical Roller Bearing and a Spherical Roller Bearing inside each "Motor-Roller". A second SKF Spherical Roller Bearing in an SKF Pillow Block at live shaft outboard location.

The Plates Roll On...

Seven years ago SKF Bearings went to work on the Motor Rollers in each of two scale tables conveying plates ¾" thick x 90" wide x 60' long at 300 feet per minute. For seven years their rolling alignment has compensated for any and all developed warpage, deflection and misalignment. For seven years their high capacity has always been 100% available, and no adjustments have been required either in initial assembly or for wear. For seven years these compact and simply-designed bearings have been doing a firstrate job in helping these rollers keep Production UP. *And they're still going strong.* Another example why SKF's are the preferred bearings in the Steel Industry.

5219

SKF INDUSTRIES, INC., FRONT ST. & ERIE AVE., PHILA., PA.

ARMY E NAVY

SKF

BALL AND ROLLER BEARINGS

MORGAN 60-TON 60'-0" SPAN CONVERTER AISLE CRANE

BUILT BY **MORGAN** *Engineering*

● **Illustrated is a Morgan heavy duty mill type crane in a converter aisle. It is equipped with fabricated welded trolley and bridge trucks; hydraulic bridge brake and anti-friction bearings. Trolley is of the gear box type having two 60-ton identical hoists using plain motors with flexible couplings. An auxiliary girder is provided for supporting the center cage. As a safety feature, special relays are incorporated in the control circuit to limit the torque of the hoist motors when "pulling collars." On such crane equipment for copper smelter service, the stability of Morgan Engineering has long been well established.**

THE MORGAN ENGINEERING CO.

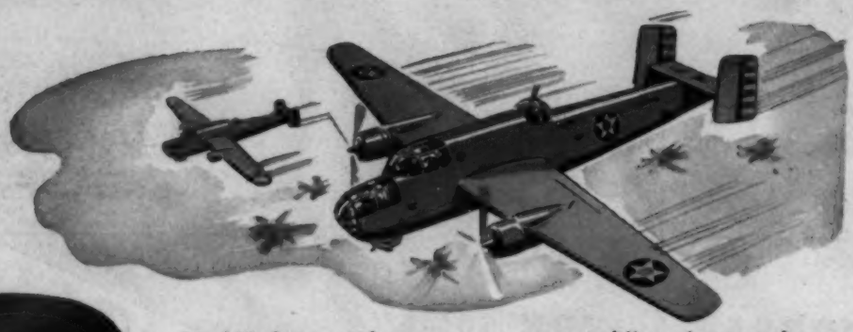
ALLIANCE, OHIO. 1420 Oliver Building, Pittsburgh

DESIGNERS • MANUFACTURERS • CONTRACTORS • BLOOMING MILLS • PLATE MILLS • STRUCTURAL MILLS • ELECTRIC TRAVELING CRANES • CHARGING MACHINES • INGOT STRIPPING MACHINES • SOAKING PIT CRANES • ELECTRIC WELDED FABRICATION • LADLE CRANES • STEAM HAMMERS • STEAM HYDRAULIC FORGING PRESSES • SPECIAL MACHINERY FOR STEEL MILLS

On Tomorrow's Cars...

AMERICAN PHILLIPS SCREWS

will give the same speedy, tight fastenings that meet battle-tests on today's planes



Phillips Driver-point fits snugly in tapered recess —WON'T SLIP OUT— permits high-speed driving.

Unskilled men and women are now assembling planes, tanks, ships and guns faster and stronger with American Phillips Screws than was ever possible using slotted-head screws and highly skilled labor.

American Phillips Screw Driving is quick and effortless:

1. Place the point of the Phillips Screw Driver Bit in the Phillips Recess (bit centers automatically).
2. Aim the driver with one hand. Other hand holds the work.
3. Press the power driver trigger . . . another American Phillips Screw driven straight and tight, with its head unburred and the work-surface unmarred. The Phillips driver can't slip out of the Phillips Recessed Head . . . can't sit any way but straight in the tapered recess. So women and inexperienced men hit top output at once, without undue fatigue or lost-time accidents. Production records and battle records prove American Phillips Screws to be among the powerful weapons of this war . . . *for they make time fight on our side.* And in the world of tomorrow, American Phillips Screws will, then as now, deliver highest speed at lowest cost. But right now, if *you* have assembly trouble on vital war work, you can save operations, time and materials with American Phillips Screws.

AMERICAN SCREW COMPANY

Providence, Rhode Island

CHICAGO
589 E. Illinois Street

DETROIT
4-258 General Motors Bldg.

NEW IDEAS *in Contactors*

CAM OPERATED
For mechanical switching of motor control circuits.

SOLENOID OPERATED
For electrical switching of motor control circuits.

RESIDUAL HOLD-IN
No hold-in current is required. Held by residual magnetism.

MULTI-POLAR
Takes place of several contactors. Simplifies control panels.

ENCLOSURES
A-B contactors available in all standard NEMA enclosures.

RELAYS
Furnished as standard in over 300 contact combinations.

Idea No. 1—A cam-operated contactor . . . actuated mechanically with cam or horizontal drive shaft. Ideal for frequent switching cycle service or automatic machines.

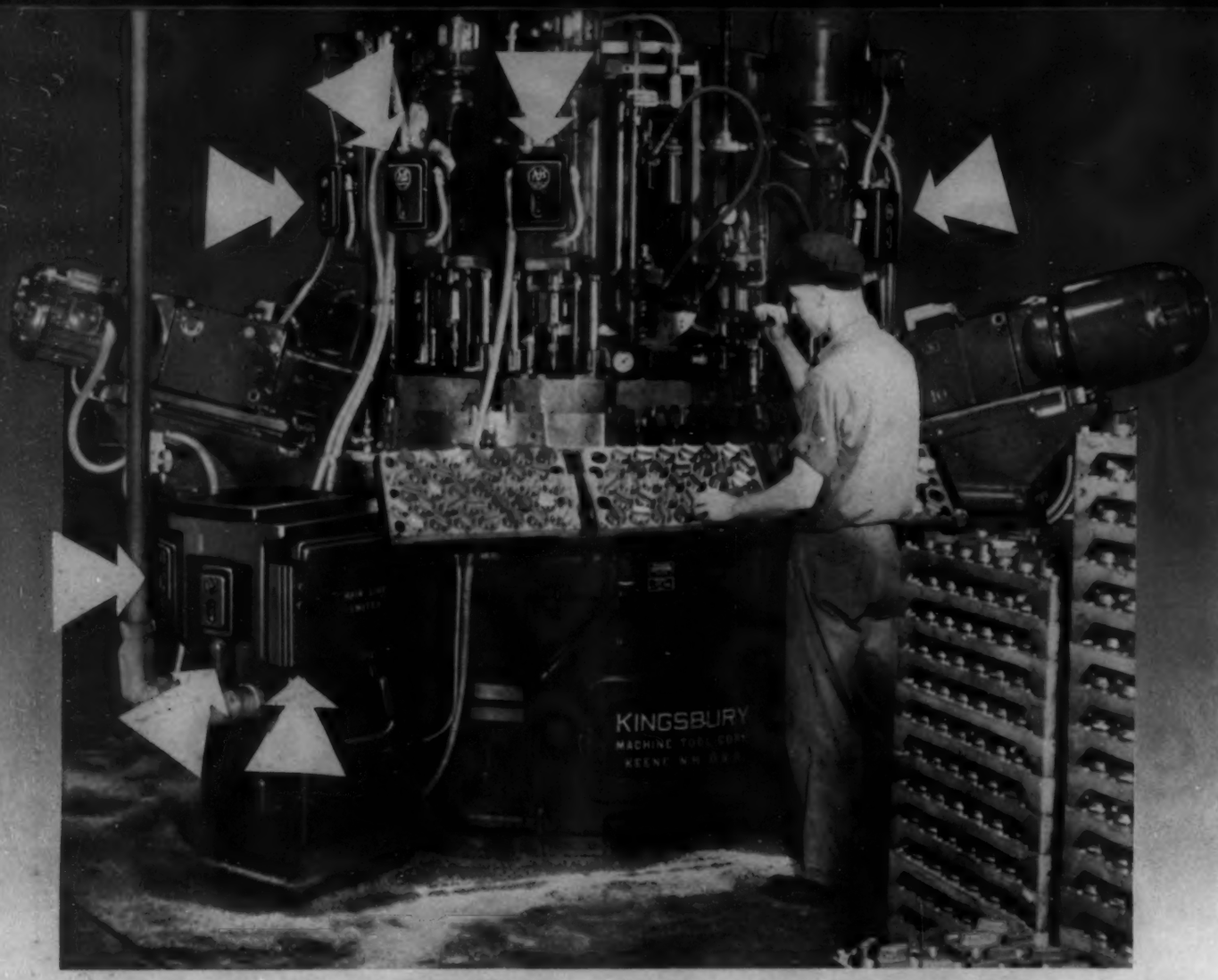
Idea No. 2—Solenoid contactors and relays . . . available in several standard control arrangements and ratings. Suitable for all types of control circuits.

Idea No. 3—Solenoid contactors with residual magnetic hold-in . . . require no supporting current to hold in after closing.

All A-B contactors are equipped with patented silver alloy, double break contacts which require no maintenance.

ALLEN-BRADLEY

A-C • D-C CONTACTORS



WHERE PRODUCTION IS A MUST... YOU'LL FIND ALLEN-BRADLEY CONTROLS

Production machines require automatic controls. For safe, positive sequence control, the contactors must perform consistently. No variations in opening and closing times can be tolerated. The precision operation of automatic machines depends upon the precision of their controls. Oscillograph tests of Allen-Bradley solenoid controls have repeatedly demonstrated their superiority in consistent switching performance. Their double break, silver alloy contacts never need maintenance. The absence of pivots, pins, hinges, and jumpers explains why they are good for millions of trouble-free operations. That's why you find A-B controls where Production is a MUST!

Allen-Bradley Company, 1320 S. Second St., Milwaukee, Wis.

THERE IS A STANDARD ALLEN-BRADLEY CONTROL FOR EVERY OPERATING REQUIREMENT!

MANUAL • DRUM • AUTOMATIC • REVERSING • COMBINATION • RELAY • MULTISPEED • PUSH BUTTON

A-B Quality

ALLEN-BRADLEY

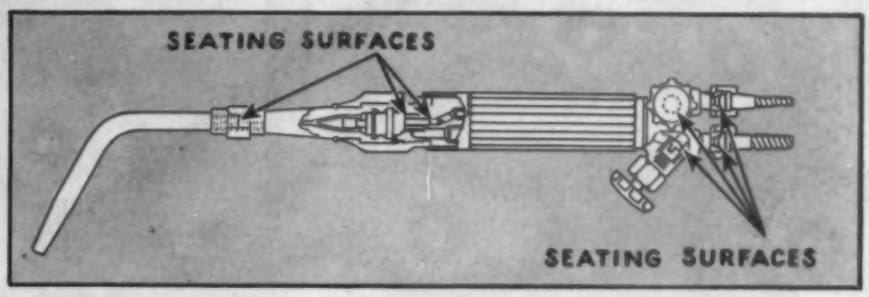
SOLENOID MOTOR CONTROL FOR ALL INDUSTRY

Are you taking advantage of LINDE AIDS to conserve Oxy-Acetylene Equipment and Supplies?

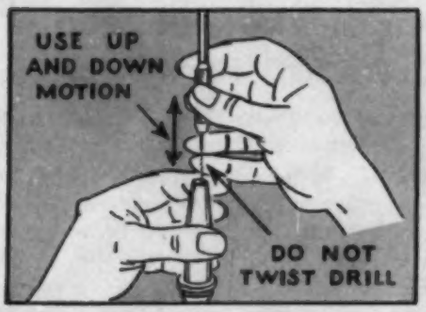
MARITIME "M" AWARD FOR OUTSTANDING PRODUCTION ACHIEVEMENT

The Linde organization supplies without charge booklets, manuals, and reprints to help make oxy-acetylene apparatus, gases, and supplies go further. One of the most useful of these is the booklet, "Precautions and Safe Practices." Some of the main points to bear in mind in your efforts toward conservation of these vital materials are outlined below. More specific information, as well as "Precautions and Safe Practices," can be obtained by sending the coupon.

Welding Rod—**Use up stub ends by tacking them to new rod—Don't over-reinforce the weld—Don't use bronze rod if another kind will do—Reduce to minimum tolerances bronze deposits to be machined—Reduce the number of rod sizes you order by selecting an average suitable for many applications.**

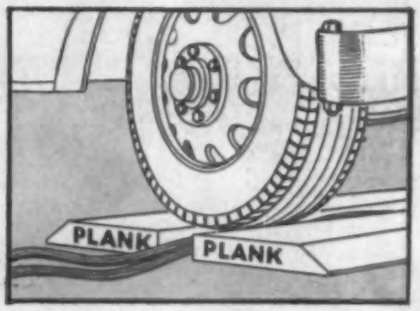


Blowpipes—**Keep seating surfaces clean and gas tight—Never tighten a welding head onto a blowpipe by twisting the stem—Always use a wrench, not pliers, in making connections where a nut is provided—Don't use blowpipes as hammers or for any purpose other than those for which they are intended—Determine and correct cause of flashbacks before using apparatus further.**



Hand-Cutting Nozzles—**Keep gas passages clear with correct size of drill—Occasionally use Oxweld Nozzle Cleaning Compound—Square up flame end of nozzles by rubbing them on emery cloth—If a nozzle is bent, straighten it carefully—Clean nozzle seats to remove scale and eliminate dents.**

Regulators—**Blow dust out of cylinder valves before connecting regulators—Always release gas pressure from regulators when equipment is not in use—To prolong life of the diaphragm, release pressure-adjusting screw after relieving pressure—Test for and replace leaky valve seats periodically—Replace broken gauge crystals.**



Hose—**If hose must cross the path of vehicles, protect it with planks—Protect hose from oil and grease—Avoid kinks and abrasion—Test hose and connections regularly for leaks—Repair leaky hose with Oxweld hose splices—Do not use tape—Use short lengths of hose—Purchase hose only when actually needed.**

Apparatus Instruction Booklets

Duplicate copies of the instruction booklets which were packed with your Oxweld, Purox, or Prest-O-Weld apparatus can be obtained, without cost, from any Linde office. ***Be sure to specify the style or number and the type of equipment you have.***

THE LINDE AIR PRODUCTS COMPANY
Unit of Union Carbide and Carbon Corporation
30 E. 42nd St., New York UCC Offices in Principal Cities
In Canada: Dominion Oxygen Company, Limited, Toronto

THE LINDE AIR PRODUCTS COMPANY
30 East 42nd Street, New York, N. Y.

Please send me sample copies of conservation material. ☐

Instruction Booklets for Blowpipes specified below.

Oxweld	Purox	Prest-O-Weld
Type.....	Type.....	Type.....

Name.....

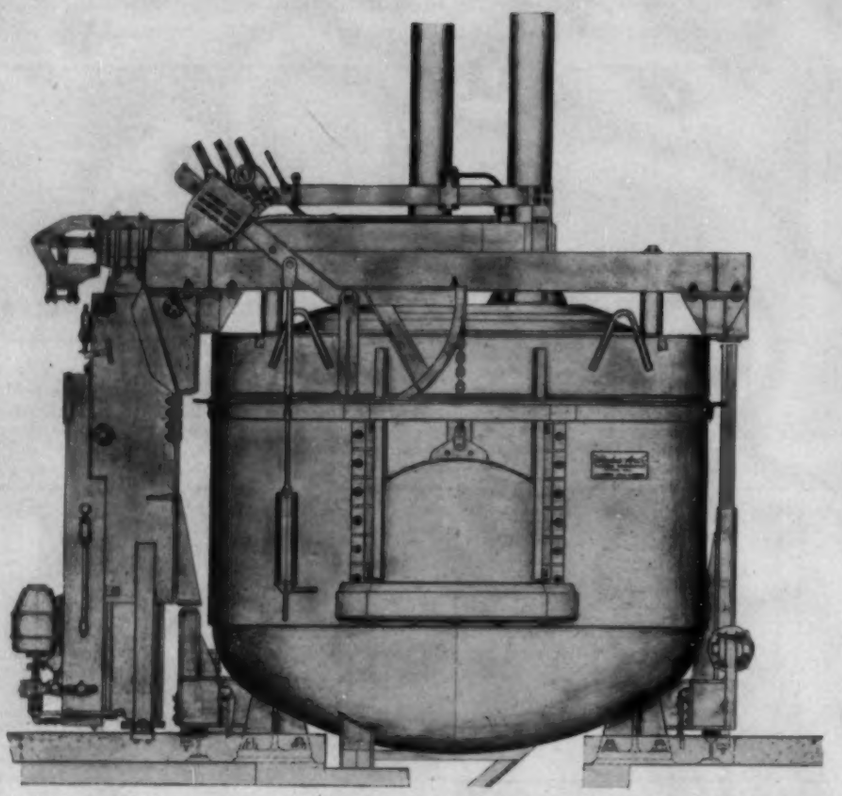
Street and No.....

City and State.....

The words "Linde," "Oxweld," "Purox," and "Prest-O-Weld" are trade-marks.

The **HYDRO-ARC** *Electric Furnace has*

Power Operated Electrode Clamps



The Electrodes are slipped from the floor. Men are not required to get on top of the furnace

This is only one of several advanced features of the Hydro-Arc Electric Melting Furnace. It has a record of especially low operating costs . . . it has low carbon pick up . . . . low electrode and power usage.

Low inertia counterbalancing and small reversing pump motors (which do not surge above their full current rating) result in (1) highest electrode speeds on automatic control, (2) most accurate positioning. The electrodes start and stop instantly in cooperation with the new automatic controls. There is less surging . . . . improved power factor and less transformer heating.

Write for more information about what has been called "The most important development in electric furnaces in the past twenty years".

HYDRO-ARC FURNACE CORPORATION
561 HILLGROVE AVENUE, LA GRANGE, ILL.
(A suburb of Chicago, Ill., U. S. A.)
Telephones: La Grange 4545 and 4546
Chicago Line: Enterprise 1068

Associated with Whiting Corporation

DoAll GAGES

The Measure Blocks of a Thousand Uses

Every manufacturer of armaments, metal parts, equipment or tools needs DoAll Gage Blocks, to check dimensions for absolute accuracy at the source and along every step during production.

DON'T TAKE CHANCES ON ANY PRODUCTION TOOLING

Be sure of your gages! World War No. 2 is being fought with measurements ten times as accurate as before.

DoAll Gage Blocks are a "must" for your laboratory, tool room and inspection department. Why risk having a whole shipment or even a partial shipment of badly needed parts rejected because they do not interchange in a certain instrument or work smoothly enough?

America has no time to wait for re-runs. Every hour counts. Parts must be right the first time, and very right. Peacetime production will insist on today's tempo of tolerances too.

DoAll Gage Blocks come in the following accuracies:

Working Set —Eight millionths of an inch.....	$295.00
Inspection Set—Four millionths of an inch.....	350.00
Laboratory Set—Two millionths of an inch.....Price on Application	

A room with temperature controlled at 68° is recommended for using this set.

Each set consists of 81 gages.

Write us immediately for complete data and good deliveries

SAVAGE TOOL COMPANY

DEPARTMENT S **SAVAGE, MINNESOTA**

Local DoAll offices distribute Gage Blocks. They also sell and service DoAll Precision Surface Grinders and the equipment shown below. See your Telephone Directory for nearest DoAll office.

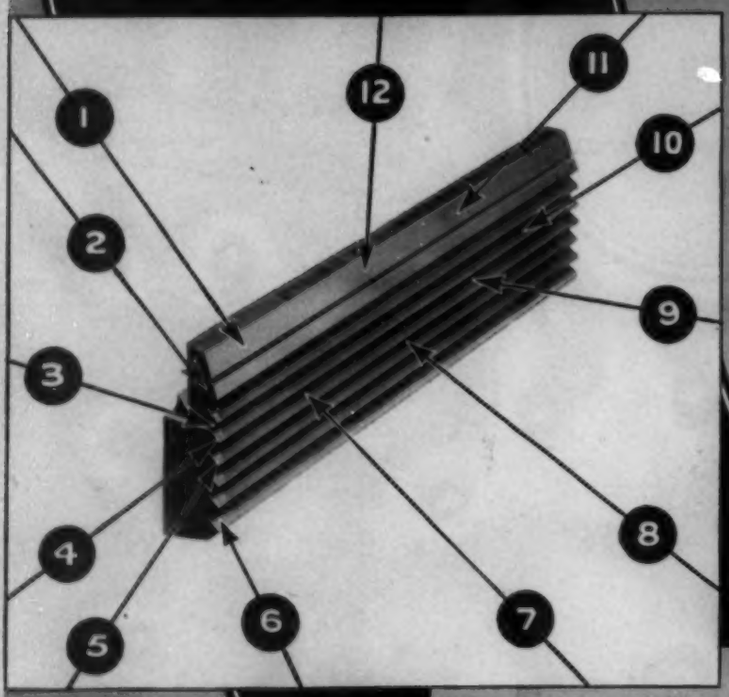
Built by our associate company, Continental Machines, Inc., Minneapolis, Minn.

DoAll Band Saws Made by our associate company, The DoAll Company Des Plaines, Ill.

Acclaimed..

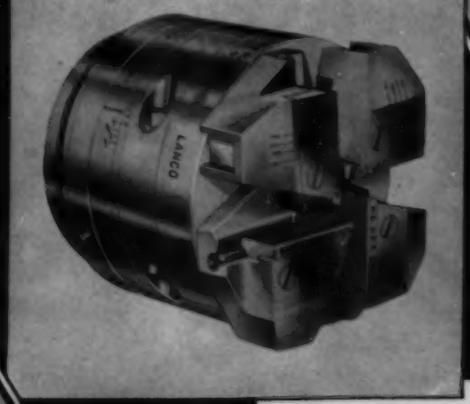
The Finest Thread Cutting Tool in Industry

The LANDIS CHASER



Used Exclusively in LANDIS Die Heads and Threading Machines

LANDIS



1-Permanent throat permits close to shoulder threading throughout life of chasers

2-Rake angle range covers all machinable materials

3-Free cutting condition permits maximum cutting speeds

4-Simple grinding operation renews entire cutting edge and leading feature

5-Line contact with work lessens friction and minimizes thread distortion

6-Leading feature insures thread of accurate lead

7-Lateral absorption of cutting strain reduces vibration and chaser breakage

8-Right and lefthand threading feature reduces chaser equipment

9-Standard chasers thread all diameters with proper chaser holders

10-Interchangeability of chasers lowers operating cost

11-Chaser length provides exceptionally long life and low tool cost

12-Permanent throat gives equal distribution of cut

The life of the Landis Chaser, due to its design which makes it possible to machine the thread form along the entire length of the chaser, is from ten to twenty times that of the hobbed type die.

The cutting edge is renewed completely at each regrinding thereby maintaining the original accuracy of the chaser. The throat is not altered by regrinding and therefore permits close-to-shoulder threading throughout the life of the chaser.

Landis Chasers are interchangeable—any one of a set may be replaced.

LANDIS MACHINE CO. Waynesboro, Pa.

WAR PLANT DISTRIBUTION SYSTEM IS ENGINEERED TO CONSERVE MATERIALS

Result:

6400 pounds of Copper saved

HOW WESTINGHOUSE CAN HELP YOU SAVE TIME AND CRITICAL MATERIALS

- **Selecting the Right System**—Wide application experience in all types of industries enables Westinghouse engineers to recommend the system best fitted to your plant.
- **Air-Cooled Transformers**—permit location close to load centers with maximum safety, eliminate expensive vaults.
- **Hipersil**—an exclusive Westinghouse development with ⅓ more flux-carrying capacity than ordinary silicon steel. Reduces transformer size and weight.
- **Loading by Copper Temperature**—permits use of *all* the transformer capacity, with complete protection against burnouts.
- **Improving Power Factor**—through use of capacitors, can often save installation of new feeder lines. Westinghouse engineers are in a position to make such practical recommendations.

A New England war plant planned to install a distribution system requiring 44,200 pounds of copper. Westinghouse engineers recommended a more flexible, better-protected system using 6400 pounds less copper.

Savings like this prove that "custom-fitting" the distribution system to the job helps to conserve critical materials.

There is no one universal distribution system suited to all plants or all industries. That's why Westinghouse plans and builds *all* types. The one that will best fit your plant is the one that takes full account of the nature, density, and location of load—with the least use of critical materials.

Any system recommended is designed to use standard distribution equipment. No time is lost in building special apparatus.

If you want fast action, call our local office. Or send for the helpful booklet shown below. Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

J-94539

QUICK FACTS ABOUT PLANT DISTRIBUTION SYSTEMS

Keep up to date on latest plant distribution systems. Send for Booklet B-3152 which briefly describes different plant distribution systems, and points out the advantages of each.

Westinghouse **PLANT DISTRIBUTION SYSTEMS**

PLANTS IN 25 CITIES... OFFICES EVERYWHERE

For Air Drawing . . . . . Aluminum Heat Treatment and Low Temperature Annealing

Hevi Duty PIT TYPE CONVECTION Furnace

HD-2828-A Pit Type Convection Furnace—Cover Swung Aside.

Interior of HD-2828-A Pit Type Convection Furnace Showing Centrifugal Fan in Bottom, and Heating Elements in Side Wall.

The Hevi Duty Pit Type Convection Furnace is used for operations such as air drawing, heat treatment of aluminum and low temperature annealing. This furnace is particularly suitable for handling small parts which can readily be loaded in the cylindrical baskets used in this type furnace. The use of a high velocity centrifugal type fan assures uniform heat penetration to all parts of the charge even when parts are small and densely loaded. Heating is accomplished principally by convection. The possibility of radiant heat from the heating elements affecting the work is eliminated by the use of an alloy shield between the heating elements and the work container.

HD-2828-A Pit Type Convection Furnace—Cover in Operating Position.

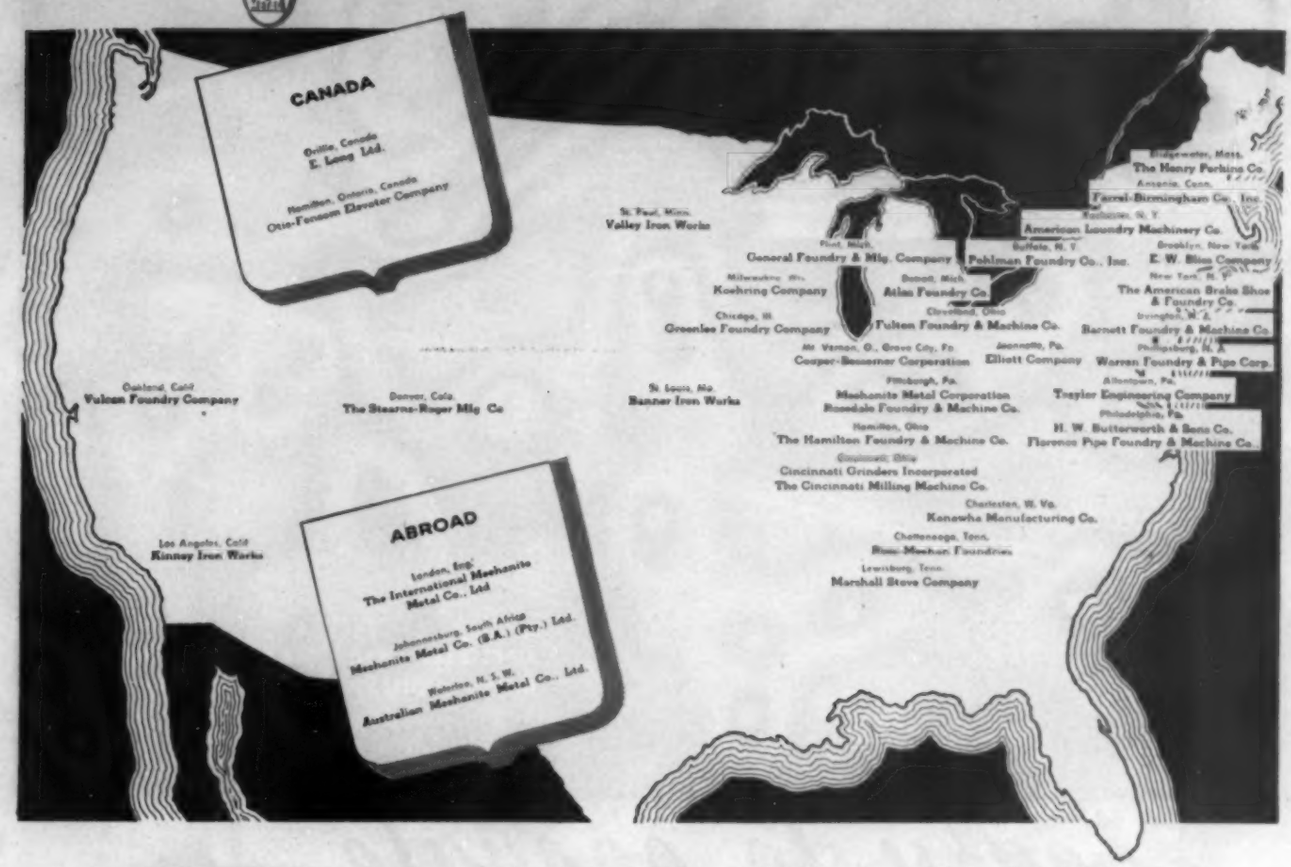
SEND FOR BULLETIN HD 1041

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI DUTY ELECTRIC EXCLUSIVELY

MILWAUKEE, WISCONSIN

MEEHANITE (M) FOUNDRIES SERVE ALL IMPORTANT PRODUCTION CENTERS



Nation-wide "KNOW HOW" solves your casting problems

No matter where you are, you won't have to go far to get genuine Meehanite castings having engineering properties meeting your specific needs! In all principal manufacturing centers, you will find well-established, modern foundries offering the exclusive advantages of Meehanite Castings.

These selected foundries are members of the Meehanite Research Institute of America, Inc., an organization established to improve foundry practice through scientific research and better manufacturing procedure, and to establish and maintain higher standards of uniform quality and dependability. Through this organization and the headquarters metallurgical staff, cooperative engineering development and research programs far beyond the scope and resources of any private foundry are constantly in progress.

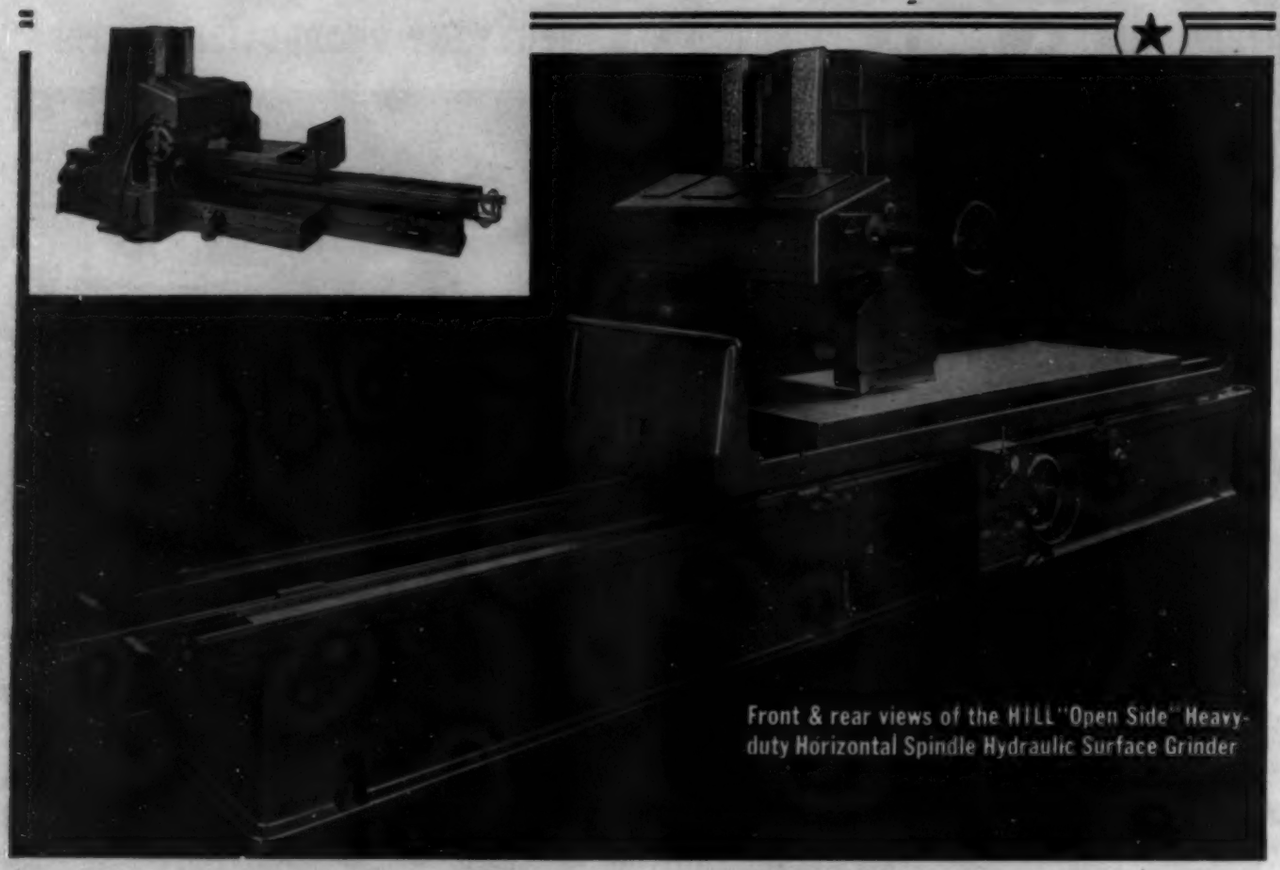
To focus the attention of this broad organization on your individual problems, get in touch with the nearest Meehanite foundry. Through them, the entire engineering and metallurgical resources of the organization are made available to you.

what is MEEHANITE?

Meehanite is a unique cast metal in which the better properties of both cast iron and steel are combined. In its 21 distinct types, Meehanite offers such properties as: high strength; resistance to heat, wear, corrosion; exceptional machinability; vibration damping; adaptability to flame hardening and heat treatment; uniform adherence to predetermined properties.

MEEHANITE RESEARCH INSTITUTE

311 ROSS STREET · PITTSBURGH, PA.



Front & rear views of the HILL "Open Side" Heavy-duty Horizontal Spindle Hydraulic Surface Grinder

★ ★ ★ *easy to operate* —

CONTROLLED PRECISION

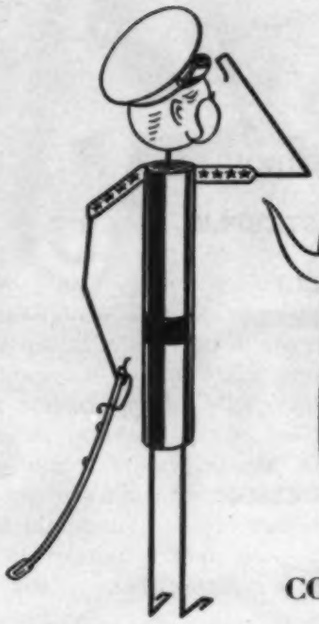
HORIZONTAL

VERTICAL

Today's *man power* problems make it imperative that machine tools be easy to operate so that inexperienced operators can quickly learn—yet precision work is demanded today as never before. HILL "Open Side" Hydraulic Surface Grinders hold the answer to both problems. In a remarkably short time, men transferred from non-essential industries are being trained to produce finished parts ground to close tolerances. We will gladly furnish you with names of HILL "Open Side" Grinder users in your territory—Ask THEM what THEIR HILL Heavy Duty Precision Grinders are doing, or send for Bulletin H-V-3 and be your own judge from the facts presented.

The HILL ACME Co.

6400 BREAKWATER AVE • CLEVELAND, OHIO



The "General" says—

"May His Spirit Prevail and **EMANCIPATE** *the World from Axis Oppression"*

GENSCO

COLD FINISHED BARS	SHEET STEEL	ROUND WIRES
COLD ROLLED STRIP STEEL	TEMPERED and ANNEALED SPRING STEEL	DRILL ROD
COLD ROLLED SHIM STEEL	ROUND EDGE FLAT WIRE	STEEL BALLS
		FEELER GAUGE

GENERAL STEEL WAREHOUSE CO. Inc.

CHICAGO—1830 N. KOSTNER AVE.

NEW YORK	CINCINNATI	MILWAUKEE
441 Lexington Ave.	5826 Hamilton Ave.	3844 W. Wisconsin Ave.
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Immediate WAREHOUSE SHIPMENTS

FOR SALE

USED STEEL MILL MACHINERY AND EQUIPMENT

250 TON HOT METAL MIXER

12" DIAMETER BLAST FURNACE BELL 45°

FOUR (4) BLOOMING MILL STACKS

NO. 3460 DIXIE NON-CLOG CRUSHER

PUNCH & SHEAR (LONG & ALSTATTER)

RECIPROCATING PUMP (LAIDLOW-DUNN GORDON COMPOUND DUPLEX)

SOUTHWARK BLOWING ENGINE (VERTICAL STEEPLE CROSS COMPOUND CONDENSING)

EVAPORATOR AND PUMP (GRISCOM-RUSSELL)

OPEN FEED WATER HEATER (GRISCOM-RUSSELL)

VACUUM PUMP (INGERSOLL-RAND)

NO. 9 CONTRAFLO DEAERATING HEATER

OIL HYDRAULIC UP-CUT BLOOM SHEAR

BAR TWISTER MACHINE

WESTINGHOUSE STEAM DRIVEN AIR COMPRESSOR

TYPE Z-1 TERRY STEAM TURBINE

TROY 4-½" x 5" VERTICAL, THROTTLING, SELF-OILING ENGINE

MOTORS

Included in our list of used equipment are 25 AC and DC motors put out by leading manufacturers of the country and ranging in size up to 75-horsepower.

CONTROL EQUIPMENT

A quantity of steel mill control equipment, mostly General Electric and Westinghouse are also available for immediate shipment.

INTERNATIONAL HARVESTER COMPANY
WISCONSIN STEEL DIVISION

180 NORTH MICHIGAN AVE. CHICAGO, ILLINOIS

PHONE: ANDOVER 4200

FIND METAL-CUTTING HORSEPOWER Quickly!

It's Easy with the G-E MOTORULE*

First you refer to a convenient table of constants, printed on each rule, choosing the constant for the particular type of metal to be cut. Then by setting the scales to the known cutting speed, feed, and cut, you arrive at the cutting power required on the basis of ideal tool and machine conditions. Complete instructions are furnished with each MOTORULE.

*The MOTORULE is not intended to supplant the instructions of machine builders as to the power requirements of their machines. It is offered to fill the gap when these recommendations are unavailable.

This newly developed load calculator makes it easy to figure the motor horsepower required for metal-cutting operations when the recommendations of the machine builder are unavailable. Its advantages? You can avoid *undermotoring* and save yourself production delays; you can avoid *overmotoring* and save the nation vitally needed steel, copper, and aluminum.

The G-E MOTORULE is accurate for a wide variety of cutting operations on lathes, drills, milling machines, and planers. It works on a wide range of materials, because you start from a convenient table of constants for the material being cut.

The results of many years of work by metal-cutting authorities were used by G-E engineers as a basis for the MOTORULE. The formulas were checked against actual load tests, and leading machine-tool builders were consulted.

The MOTORULE will help you in making sure of adequate motor capacity on machines being put to new war work, and in selecting motors for machines formerly driven from line shafting. To get your MOTORULE, just get in touch with your G-E Motor Representative. Or, if you wish, mail the coupon direct to General Electric, Schenectady, N. Y.

SPECIFY **TRI/CLAD** MOTORS

Standard G-E Motors Are Generally Available without Delay for War Jobs

General Electric Co., Sec. T-759-159
Schenectady, N. Y.

☐ Please send your MOTOR FITNESS MANUAL, GED-1017.

☐ Please send me a G-E MOTORULE, with full instructions and leaflet giving the principles on which it is based.

Name .....

Title .....

Company .....

Street .....

City ..... State .....

GENERAL ELECTRIC

PEACE TERMS

are being written in "Facts-in-Figures"

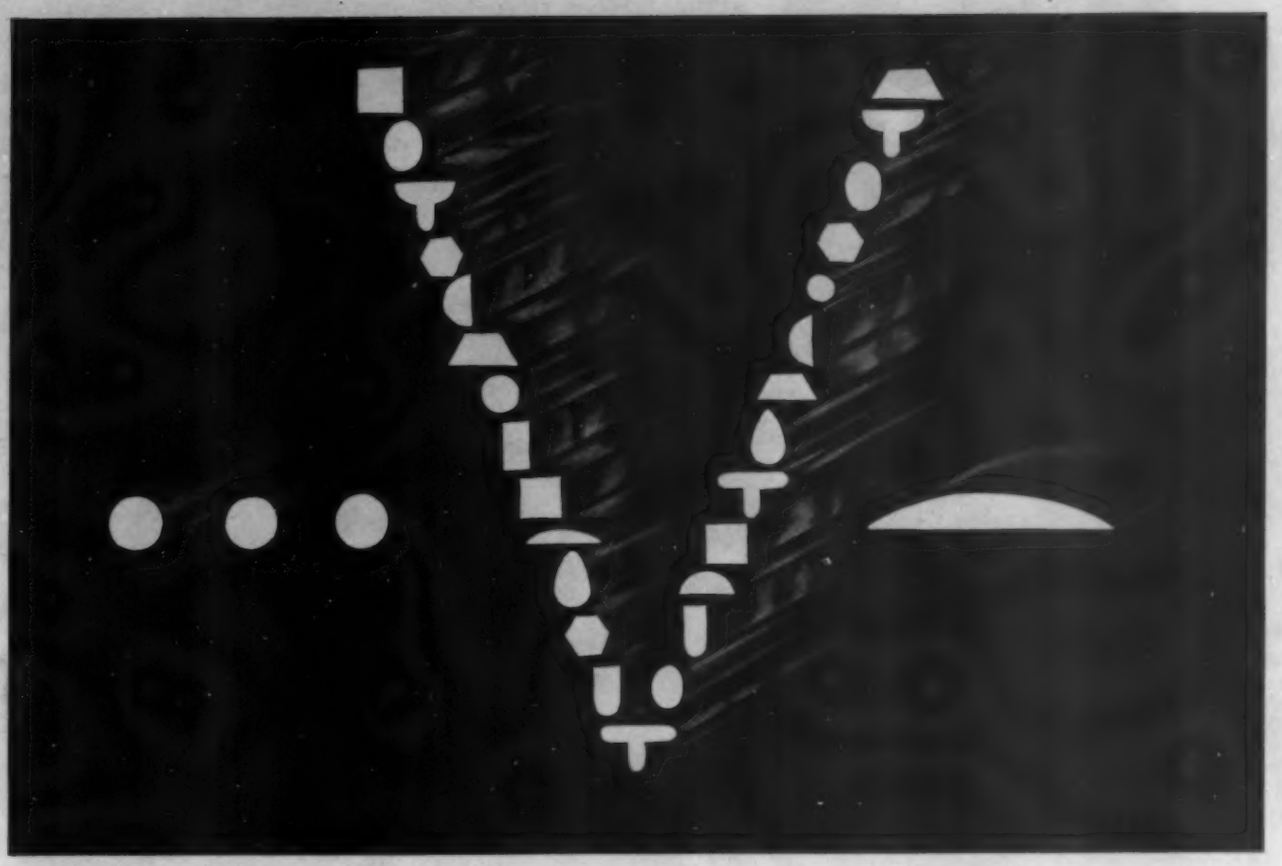
RIGHT NOW

Veeder-Root

INCORPORATED

The Counting House of Industry

The length of the war and terms of the peace are being forecast *today*, in plain black-and-white, by American production machines . . . in hourly and daily facts in figures supplied by Veeder-Root Counting Devices. This accurate "current history" of production eliminates the confusion and uncertainty that cuts down speed and efficiency where no count is kept . . . prevents over-runs and shortages . . . improves interdepartmental co-ordination and timing. All of which is a solid contribution toward one end . . . *a quicker end to this war*. So if your work counts importantly in the War Effort, find out how Veeder-Root can help you make it count to the utmost.



Everything in Wire . . . For Victory

Here at Wire Headquarters you will find everything you need in wire: high and low carbon wire, round, flat, or shaped wire, wire for springs, for wire rope, for use in hundreds of applications, in a variety of sizes, tempers, grades and finishes.

Back of every inch of it is all the skill acquired in 122 years of research, discovery and pioneering—the things which have made Wissco one of the world's leading specialists in wire. The thousands of Wickwire Spencer workmen are breaking all-time records in producing Wissco wire for Victory needs, watching every step as it goes through our blast furnaces, open hearths and wire mills on its way for use in war equipment.

If you have a wire need for war, put it up to experts. Wickwire Spencer Steel Company, 500 Fifth Avenue, New York: Buffalo, Chicago, Detroit, Philadelphia, San Francisco, Worcester.

FROM A TO Z every step in the manufacture of Wissco wire, from ore pile to finished product, is taken right in our own mills. That's one reason for the *uniformity* for which Wissco wire is famous.

SEND YOUR WIRE QUESTIONS TO WICKWIRE SPENCER

WISSCO WIRE

BY WICKWIRE SPENCER

WISSCO PRODUCT

IT MAKES SHIPS "GROW" FASTER!

Hoist Design Based on Oil Field Experience Employs Sextuple Width Silverlink Roller Chain

● Developed to meet the requirements of the oil industry, the toughest service known, this sturdy, 50-ton Turney hoist has been enthusiastically adopted by shipbuilders to aid the speedy erection of the mighty fleet so vital to our victory.

From their past experience with chain, the manufacturers, Portable Rig Company, readily selected Link-Belt Silverlink roller chain and Link-Belt sprockets for the important function of transmitting power from motor to drums. Employing 1" pitch, sextuple width chain, this drive provides great strength with comparatively light weight, positive power transmission, flexibility and unusual ability to withstand severe shocks of starting, stopping and holding heavy loads.

Cushioned Roller Assures Longer Wear

When the sprocket teeth mesh with Silverlink roller chain, the unique curled roller acts as a shock-absorbing spring which resists hard blows —reduces wear and repairs.

LINK-BELT COMPANY

Indianapolis, Chicago, Philadelphia, Atlanta, Dallas, San Francisco, Toronto
Cleveland, Pittsburgh, Detroit
Offices, Warehouses and Distributors in Principal Cities

2806-A

LINK-BELT SILVERLINK ROLLER CHAIN

FOR DRIVES AND CONVEYORS

TOO OLD to carry a gun? Well, maybe! But not too old to fight for a decent world for my grandson to live in.

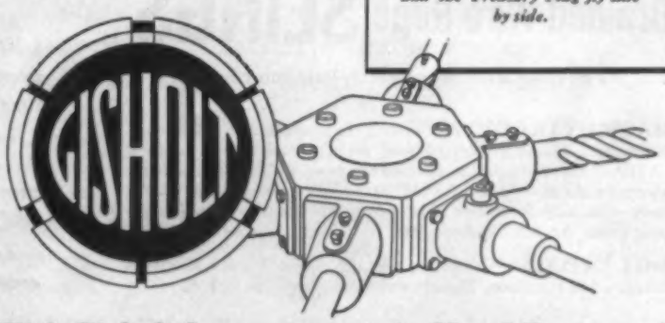
I fight with the weapons America understands best—machine tools, mass production—interchangeable parts!

I make this part over and over again. It's always the same—always accurate, so that on assembly line or in the repair shop, the parts always fit—precisely!

My Gisholt and I will keep at it—making parts that are *fit to fight*—until the last shot has been fired.

GISHOLT MACHINE COMPANY
1217 East Washington Ave., Madison, Wis.

At Gisholt, the Army-Navy "E" and the Treasury Flag fly side by side.



★ *Look Ahead . . . Keep Ahead . . . With Gisholt Improvements in Metal Turning* ★

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES

Handle with care — but hurry!

YOU DO BOTH WITH THE SLING WITH THE DOUBLE-S* GRIP

** the sling that handles loads with* both *SPEED and SAFETY*

Take a good look at the construction of the Macwhyte Atlas Wire Rope Sling. This sling, "hurrying" production of war materials in plants all over the U. S., provides unquestioned safety because of its special construction. Two

endless wire ropes, each of opposite lay, are spirally woven throughout. The result is a perfectly balanced sling body. In addition to safe and speedy materials handling, Macwhyte Atlas slings have many advantages:

• Light-weight, flexible, easy to handle • Positively non-spinning • Kink-resistant • Non-damaging to loads • Balanced construction of left-&-right lay endless ropes • Store in small space • No splices to wicker • Terminate in natural loop-ends • L-O-W final cost

"Keep 'em rolling"... but do it with SAFETY.

*Speed Plus Safety

MACWHYTE ATLAS

Braided Wire Rope SLINGS

"The sling with the perfectly balanced *body"*

MACWHYTE COMPANY, 2912 Fourteenth Ave., Kenosha, Wisconsin. Manufacturers of wire rope to meet every need — "ATLAS" Left-&-Right Lay Braided Slings — "DREW" flat braided wire rope slings — "MONARCH" Standard rope slings and grommets — Stainless Steel Wire Rope — Monel Metal Wire Rope — Aircraft Cable, Aircraft Tie-Rods, and "Safe-Lock" Swaged Terminals.

MILL DEPOTS: Pittsburgh · Chicago · Fort Worth · Portland Seattle · San Francisco. Distributors throughout the U.S.A.

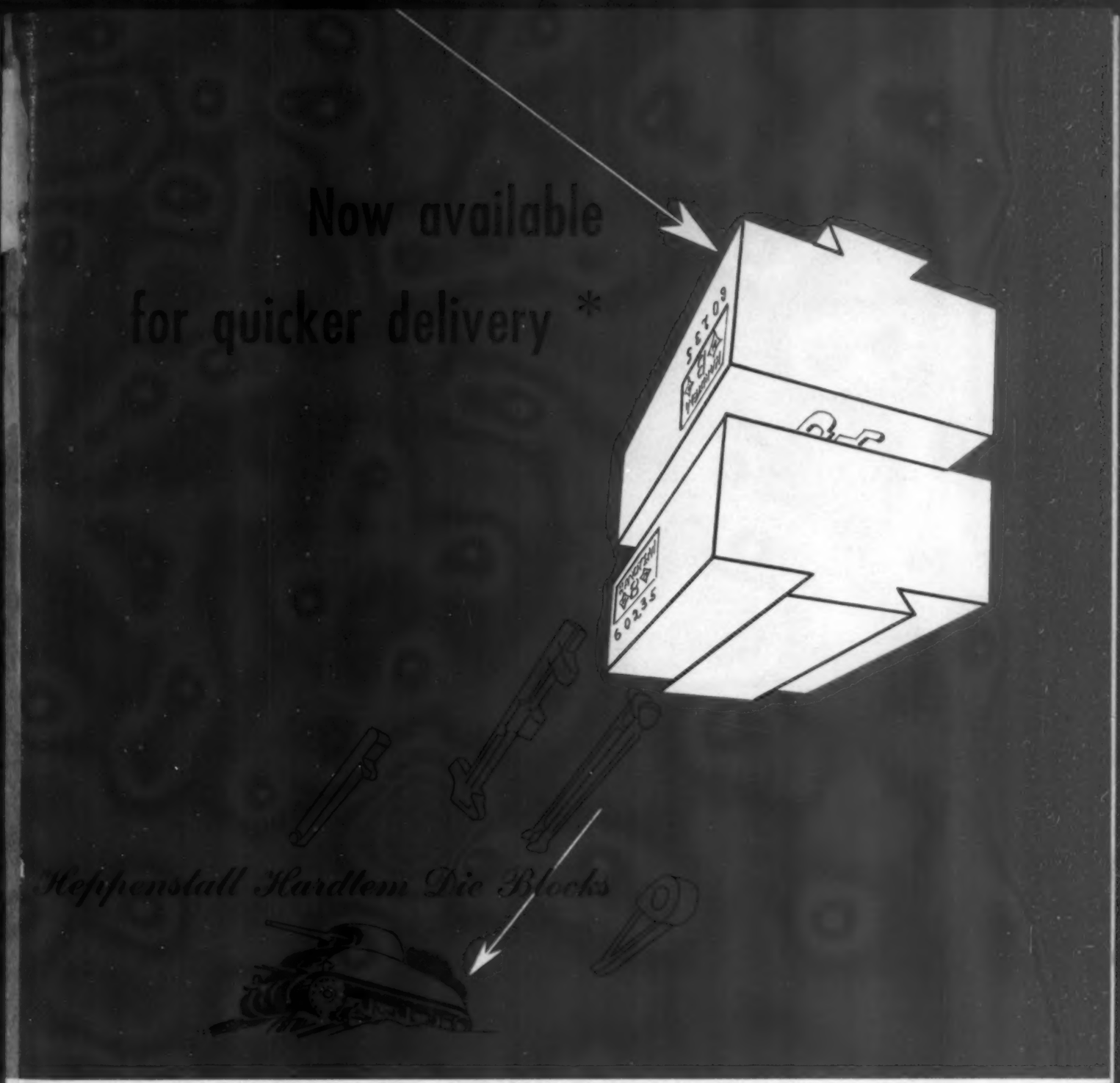
CONSULT MACWHYTE ON YOUR SLING PROBLEMS

For years we have been making many types of slings, for many kinds of jobs. We're busier today than ever before... supplying Macwhyte Atlas Slings to war production plants all over America.

Ask us for suggestions on how to move your loads fast WITH safety. Plan your sling needs as far in advance as possible. Tell us the kind of work to be done; we'll suggest the type of sling to do it.

Take special care of your slings. By so doing you can make them last longer, help yourself, and aid the war effort. That's what YOU want; that's what your country asks of you.

Time and materials are vital. On sling problems, consult Macwhyte. Save both time and materials.



*Recent expansion of production facilities has now made possible faster delivery on Heppenstall Hardtem Die Blocks.

There has been no change in Heppenstall quality standards . . . Hardtem Die Blocks are still forged from the best acid open hearth alloy die block steel and heat treated by the exclusive Hardtem process which assures you more forgings per sinking. Specify Hardtem, get quicker delivery plus assured quality.

Heppenstall

PITTSBURGH • DETROIT • BRIDGEPORT
EDDYSTONE

Forging Fine Steels for Fifty-Three Years

A SPECIAL EGYPTIAN CLEAR LACQUER to Apply Over Black Oxide Coatings

Experience-taught formulators in EGYPTIAN laboratories have developed this special lacquer to provide needed protection against salt spray and staining in handling Black Oxide Coated articles.

Many war contracts require such protection.

Oil, sometimes used for this purpose, is at best a temporary expedient. It has no advantages beyond immediate protection. Articles so coated are unpleasant and hard to handle.

EGYPTIAN Special Clear Lacquer used over Black Oxide Coated articles, is meeting with unqualified success on all fronts. It provides full protection against staining and spotting from handling, and also against that destructive ally of corrosion—salt spray.

Let us send you a sample of this new EGYPTIAN finish, and information about other EGYPTIAN items that are triumphing over the harsh uses and frequent abuses of war service.

Have you a copy of our loose-leaf booklet, "U. S. Government Specification Finishes," indispensable to war plants with metal finishing problems? Just ask for "Spec" Book S

These are a few of the more important Government "Spec." finishes which we can furnish. For more complete list send for "Spec." book.

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PROTECTIVE COATING

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BLACK BAKING
ENAMEL

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CLEAR FINISH
FOR STEEL CARTRIDGE CASES

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FOR AMMUNITION

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LUSTRELESS PAINT FOR AMMUNITION

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NITROCELLULOSE LACQUER ENAMEL
FOR AMMUNITION

P-37-b-2
ZINC CHROMATE PRIMER

84
ZINC CHROMATE PRIMER

AN-TT-P-656
ZINC CHROMATE PRIMER

PXS-979
LACQUER ENAMEL FOR AMMUNITION
(CELLULOSE TYPE)

THE EGYPTIAN LACQUER MANUFACTURING CO.
ROCKEFELLER CENTER, NEW YORK, N. Y.

EGYPTIAN FINISHES

EGYPTIAN Superior FINISHES

HOW TO STORE LUMNITE

CHECK THESE IMPORTANT POINTS AGAINST YOUR PRESENT PRACTICE

CARE in handling and storing LUMNITE helps to conserve the supply needed for making Refractory Concrete and for other essential war uses. Proper storage prevents waste. It helps save the valuable raw materials required for the manufacture of LUMNITE. Further, the size of minimum carload shipments has been increased 60% by wartime freight regulations. This means longer storage of LUMNITE by many purchasers.

So, guard your stock of LUMNITE. To care for it properly the suggestions on this page should be followed.

STORAGE OF LUMNITE IN STOCK

1. Have the storage place as airtight and weathertight as possible. Keep windows and doors closed except when moving LUMNITE in or out of storage.

2. Store LUMNITE above ground level, as ground water will injure quality, cause slow setting and low strength.

3. Pile bags closely together to reduce circulation of air. Pile bags directly on floor, if floor is dry. Do not stack against walls, but lay end bags alternately lengthwise and crosswise to prevent overturning of piles.

4. For long-time storage, pile bags 7 high.

5. For short-time storage, bags may be placed 12 to 15 high. Remember that pressure may cause caking of LUMNITE in bottom bags. In that case, recondition the LUMNITE by rolling the bag when it is taken out of storage.

6. Remove first the LUMNITE that has been in storage the longest.

HANDLING LUMNITE ON THE JOB

1. Pile bags in dry place. Keep off damp ground. If exposed to weather, cover with tarpaulins.

2. In hot weather, protect LUMNITE from direct rays of the sun. Store in cool place, if possible.

3. Do not store LUMNITE near operating furnaces where it will soak up heat. Absorbed heat will cause quick setting and low strength.

• • •

If you would like to have reprints of this page for posting at the point of storage or on bulletin boards, let us know how many you need. For information on the economical use of LUMNITE in making Refractory Concrete and Refractory *Insulating* Concrete write: Dept. S., The Atlas Lumnite Cement Company (United States Steel Corporation Subsidiary), Chrysler Building, New York City.

LUMNITE FOR REFRACTORY CONCRETE

3 NEW WAYS

to speed output . . .

1 **"MX" WHEELS** combine light stock removal with finishing and polishing action. They are free-cutting and are to be used dry on any portable machine. For breaking down sharp edges on gears etc., finishing and polishing out-of-the-way places.

CARBORUNDUM PRESENTS 3 NEW "WEAPONS FOR PRODUCTION"

KEEPING pace with the war program, Carborundum has developed many new and novel coated abrasive products—Weapons for Production to speed output, insure high finishes and lower costs. Here are three of the most versatile and useful! They are particularly adapted for finishing and polishing out-of-the-way places on airplane engine parts and similar metal work.

1. ***"MX" Wheels*** are fabricated from cotton fibres intimately intermingled with Aloxite Brand Aluminum Oxide or Carborundum Brand Silicon Carbide grain. They are made in six grades of hardness.

2. ***Cloth Cartridge Rolls*** are made in diameters from 3/8 to 1 inch of tightly wound, glued strips of metal working abrasive cloth. Rolls are from 1 to 3 inches in length.

3. ***Multi-Slotted Discs*** afford a time-saving, cost-saving way to burr and polish the edges of holes in metal work. Produced in all necessary grits, in diameters from 1/2 to 6 in.

CARBORUNDUM
ABRASIVE PRODUCTS

2 **CLOTH CARTRIDGE ROLLS** can be mounted on a spindle and used on a portable tool for finishing hard-to-reach surfaces. As abrasive surface wears down, cloth backing can be torn off to expose fresh layer of abrasive.

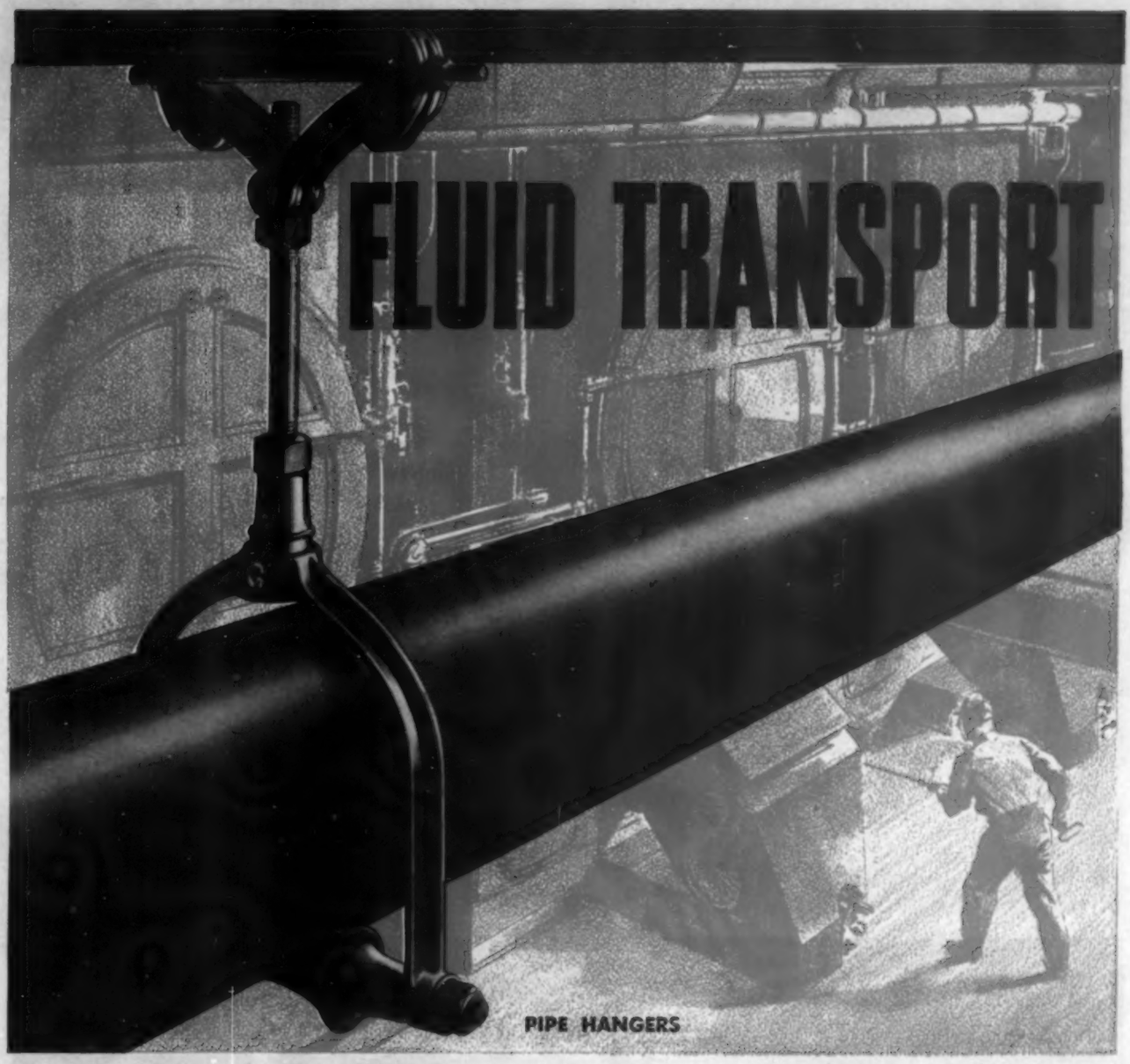
3 **MULTI-SLOTTED ABRASIVE DISCS** simplify the job of removing the burr and producing the true radius required on holes. Used in a portable power tool, the disc "cones" backward, finishing only the hole edge. When two discs are mounted together back to back, they can be used to finish both edges.

THE CARBORUNDUM COMPANY, NIAGARA FALLS, N. Y.

REG. U. S. PAT. OFF.

Sales Offices and Warehouses in New York, Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh, Cincinnati, Grand Rapids

(Carborundum and Aloxite are registered trade-marks and MX is a trade-mark of, and indicate manufacture by The Carborundum Company)



"THE NORTH WING HAS STOPPED 'SQUAWKING'." It takes more than pipe alone to distribute steam for power, processing and heat to all the spots in a plant where steam is essential. It calls for experienced piping engineering to compensate for such factors as weight, pressures, exposures, expansion and contraction.

The distribution of steam is a job for Grinnell FLUID TRANSPORT. As fabricators and manufacturers Grinnell supplies the connecting links which convert a pile of pipe into a complete piping system.

For new war construction, or maintenance and repair of existing piping, call your nearby Grinnell branch. Grinnell Company, Inc., Executive Offices, Providence, R. I. Plants and offices throughout the U. S. and Canada.

GRINNELL

WHENEVER **PIPING** IS INVOLVED

MORE SCRAP

means

more steel

The more scrap the steel producers get, the more steel they can turn out. Every pound of scrap you have should be turned over to your Scrap Dealer. He will rush it to the steel mills where it will be used to make more steel for our Armed Forces.

Collect your scrap *now* . . . keep it rolling for Victory.

WEIRTON STEEL COMPANY—WEIRTON, WEST VIRGINIA

Sales Offices in Principal Cities

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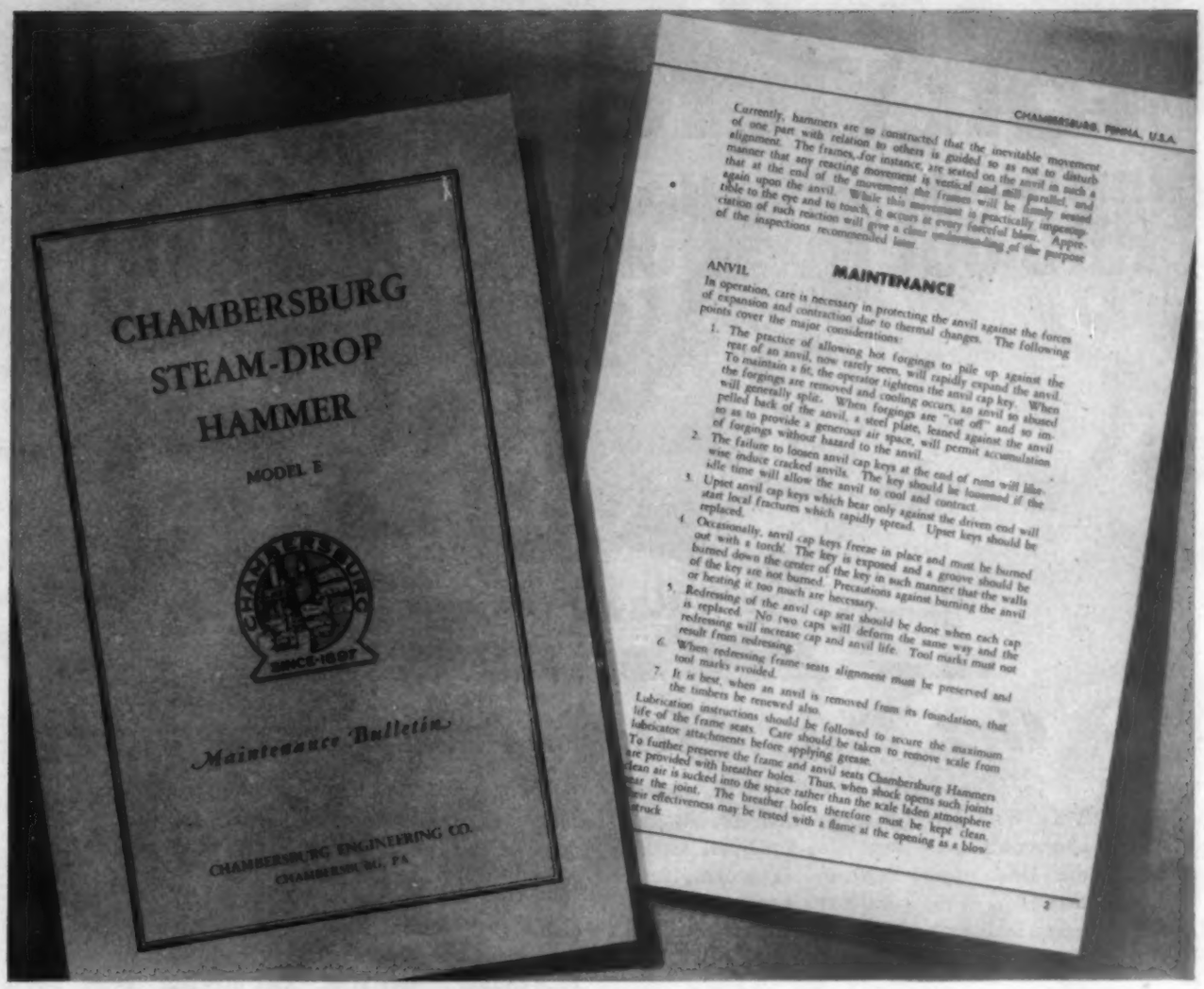
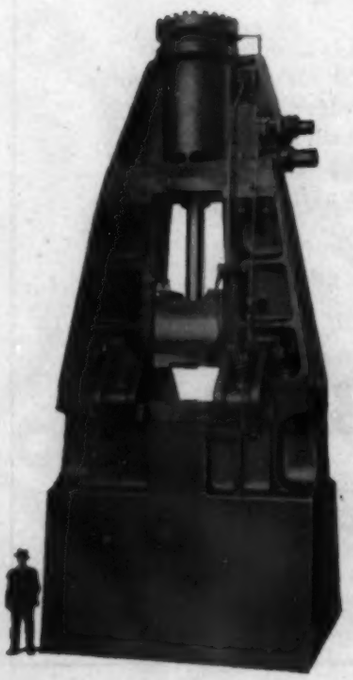

CHAMBERSBURG
STEAM-DROP
HAMMER
MODEL E
SINCE 1897
Maintenance Bulletin
CHAMBERSBURG ENGINEERING CO.
CHAMBERSBURG, PA.
CHAMBERSBURG, PENNA., U.S.A.
Currently, hammers are so constructed that the inevitable movement of one part with relation to others is guided so as not to disturb alignment. The frames, for instance, are seated on the anvil in such a manner that any reacting movement is vertical and still parallel, and that at the end of the movement the frames will be firmly seated again upon the anvil. While this movement is practically imperceptible to the eye and to touch, it occurs at every forceful blow. Appreciation of such reaction will give a clear understanding of the purpose of the inspections recommended later.
MAINTENANCE
ANVIL
In operation, care is necessary in protecting the anvil against the forces of expansion and contraction due to thermal changes. The following points cover the major considerations:
1. The practice of allowing hot forgings to pile up against the rear of an anvil, now rarely seen, will rapidly expand the anvil. To maintain a fit, the operator tightens the anvil cap key. When the forgings are removed and cooling occurs, an anvil so abused will generally split. When forgings are "cut off" and so impelled back of the anvil, a steel plate, leaned against the anvil so as to provide a generous air space, will permit accumulation of forgings without hazard to the anvil.
2. The failure to loosen anvil cap keys at the end of runs will likewise induce cracked anvils. The key should be loosened if the idle time will allow the anvil to cool and contract.
3. Upset anvil cap keys which bear only against the driven end will start local fractures which rapidly spread. Upset keys should be replaced.
4. Occasionally, anvil cap keys freeze in place and must be burned out with a torch. The key is exposed and a groove should be burned down the center of the key in such manner that the walls of the key are not burned. Precautions against burning the anvil or heating it too much are necessary.
5. Redressing of the anvil cap seat should be done when each cap is replaced. No two caps will deform the same way and the redressing will increase cap and anvil life. Tool marks must not result from redressing.
6. When redressing frame seats alignment must be preserved and tool marks avoided.
7. It is best, when an anvil is removed from its foundation, that the timbers be renewed also.
Lubrication instructions should be followed to secure the maximum life of the frame seats. Care should be taken to remove scale from lubricator attachments before applying grease.
To further preserve the frame and anvil seats Chambersburg Hammers are provided with breather holes. Thus, when shock opens such joints clean air is sucked into the space rather than the scale laden atmosphere near the joint. The breather holes therefore must be kept clean. Their effectiveness may be tested with a flame at the opening as a blow is struck.
2

GET THE MOST OUT OF YOUR HAMMERS



Chambersburg 35,000 lb. Model "E" Steam Drop Hammer

DROP FORGINGS are more essential today than ever before. Millions of forgings per year are needed for the aircraft program alone. Production of hammers at Chambersburg is at an all time high... Yet more are needed. Older hammers must therefore do more than ever... must last longer. There are many ways to get more out of your hammers... perhaps you can get some new ideas out of our Model "E" Steam Drop Hammer Maintenance Book... Write for a copy... even if your hammers are *not* Chambersburgs.

CHAMBERSBURG ENGINEERING CO., CHAMBERSBURG, PA.

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HAMMERS · DROPSTAMPS · PRESSES

FOR VICTORY TODAY AND SOUND BUSINESS TOMORROW

Get This Flag Flying Now!

This War Savings Flag which flies today over companies, large and small, all across the land means *business.* It means, first, that 10% of the company's gross pay roll is being invested in War Bonds by the workers voluntarily.

It also means that the employees of all these companies are doing their part for Victory . . . by helping to buy the guns, tanks, and planes that America and her allies *must* have to win.

It means that billions of dollars are being diverted from "bidding" for the constantly shrinking stock of goods available, thus putting a brake on inflation. And it means that billions of dollars will be held in readiness for post-war readjustment.

Think what 10% of the national income, saved in War Bonds now, month after month, can buy when the war ends!

For Victory today . . . and prosperity *tomorrow,* keep the War Bond Pay-roll Savings Plan rolling in *your* firm. Get that flag flying now! Your State War Savings Staff Administrator will gladly explain how you may do so.

If your firm has not already installed the Payroll Savings Plan, *now is the time to do so.* For full details, plus samples of result-getting literature and promotional helps, write or wire: War Savings Staff, Section F, Treasury Department, 709 Twelfth Street NW., Washington, D. C.

Save With

War Savings Bonds

This Space Is a Contribution to America's All-Out War Program by

STEEL

Jones is *Already* Planning for 194?

Right now, Jones, like the rest of us, has just one job — the job of winning a war. His factory is turning out machine gun parts by the thousand — day and night.

But he's mighty anxious to get back to making stokers. That's his regular business. And he's already putting in a lot of extra hours planning a better stoker than he ever made. He won't be caught napping. While the shouts of Victory are still ringing out, Jones will be ready. He'll know exactly what he wants to do — and he'll do it.

There are thousands of Joneses. They're the men who were making bicycles and monkey wrenches and air conditioners before Pearl Harbor. They've learned a lot about new materials and new methods during these hectic days of armament production. And they're going to profit by their experience.

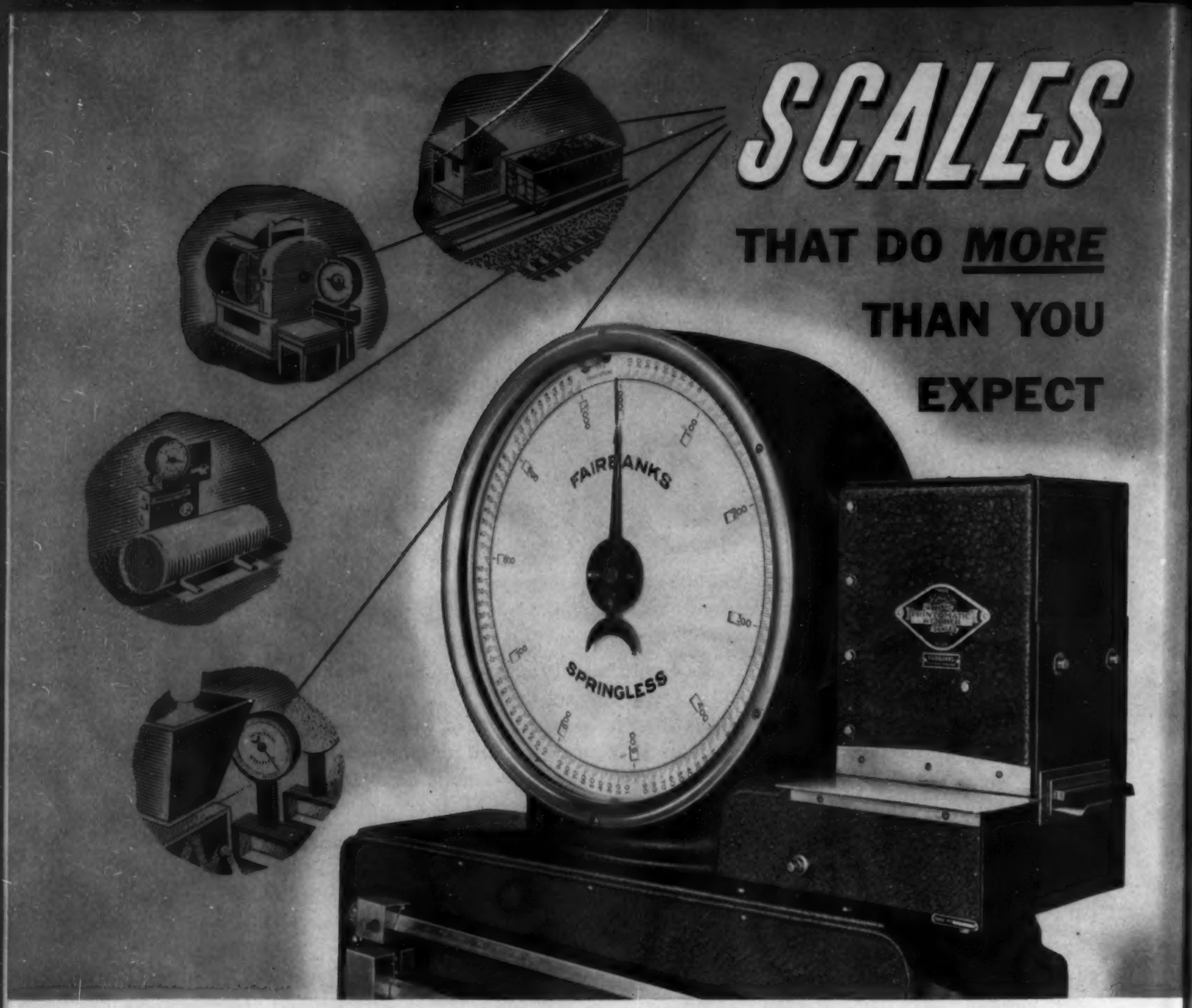
> One of the important things that these men have learned is the advantage of using forgings instead of castings for certain parts. In the building of fighting equipment, *Forgings by Phoenix* have been given some of the toughest assignments. They have demonstrated their ability to provide extra strength and endurance without excess weight and bulk. Held to close tolerances, and with a minimum of machining necessary, they are an important factor in speeding up production and lowering costs.

In your plans for the future of your product, consider the use of *Forgings by Phoenix,* and when today's job is done, we'll be happy to serve you.

★ ★ ★ FORGINGS by PHOENIX ★ ★ ★

PHOENIX MANUFACTURING COMPANY

CATASAUQUA, PA.



OF course, Fairbanks Scales are big, husky, and accurate. You have a right to expect these things in *any* good scale — and particularly of Fairbanks Scales with the world's broadest scale manufacturing experience behind them.

The feature about Fairbanks Scales that may surprise you the most, is their ability to do things you *don't* expect of scales.

Here are a few of many jobs done by Fairbanks Scales:

- They count small parts — more accurately than manual counting
- They weigh carloads of coal in motion and make a printed record of each weight
- They automatically control paint ingredients
- They automatically control aggregates
- They "keep the books" in steel plants, making printed records of incoming and outgoing shipments
- They keep accurate records on chlorination in water treatment
- They record the *flow* of liquid chemicals
- They guard secret formulas in compounding
- They control batching in bakeries
- They prevent disputes by eliminating the human element in weighing.

AND all of these things, only the beginning of the story, they do automatically and mechanically thereby eliminating human errors.

How Fairbanks Scales can be fitted into your production flow to speed up operations and eliminate errors may prove to be the most interesting discovery you ever made. Investigate now. Write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Illinois.

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DIESEL ENGINES
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FAIRBANKS SCALES

Scales

Briquetted metal chips and turnings provide important raw material source. P. 84

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Off you go . . . to Tokyo!

"If you could stand down here like I do and see these red hot rods coiling themselves like snakes, ready to strike at the Axis . . .

"And then think that every hour this mill turns out about 173 miles of rod that's got a ± .005 . . .

"You'd feel as tho' you were helping the guys who'll deliver this stuff to Berlin and Tokyo — no foolin'!"

MORGAN CONSTRUCTION COMPANY • WORCESTER, MASS.

HIGHLIGHTING

this issue of STEEL

POST WAR PLANNING This week's discussion on the subject of postwar planning is concerned mainly with a plan of direct government investment aimed at bolstering the economy after the war. The plan visualizes a flexible system under which the amount of government money flowing into public improvements at any given time would be increased or decreased, depending on the amount of private business activity. Whether the average business man sees merit in this concept, or whether he does not, he should familiarize himself with it, for a majority of the planners believe that full employment can be maintained only through some such use of government funds (p. 60).

Industry in general is stepping up its efforts to plan for the postwar economy. For example, the automobile industry has accumulated statistics and other data having to do with the impact of the end of the emergency on its own affairs (p. 67). . . Another development that has to do with postwar planning is the announcement by the field director of the Chamber of Commerce of the United States that more than 1,000,000 American families intend to spend five billions of dollars for housing (p. 57).

WPB In a new Mineral Resources Co-ordinating Division, whose director is Howard Young, St. Louis, president of the American Zinc, Lead & Smelting Co., has been consolidated all responsibility for assuring sufficient supplies of minerals and metals for essential war production (p. 64). A good many fingers have had a hand in cutting this pie so that the new setup should permit smoother and more efficient functioning.

Manufacturers who are confused with reference to the Controlled Materials Plan will be comforted by the knowledge that even the administrators of the plan are confused. They admit that many "bugs" will have to be ironed out before it can function as desired. In the meantime manufacturers should read CMP regulations carefully and furnish needed information as promptly as possible; questions will be decided as they arise (p. 65).

Recent authorization of a sharp increase in production of farm machinery during the first quarter apparently has been nullified by inability of the manufacturers to get the required steel (p. 55). The whole subject thus again becomes one for lively controversy.

DISTRESSED PLANTS In order to provide more intensive assistance to distressed plant managements, the Smaller War Plants Division of the War Production Board has opened twelve regional offices, headed by regional directors, and 131 district offices, empowered to take action on the spot. Operators of distressed plants should get in touch with these offices and supply information the Smaller War Plants Division's representatives need to have in order to look for such business as the distressed plants can handle (p. 64).

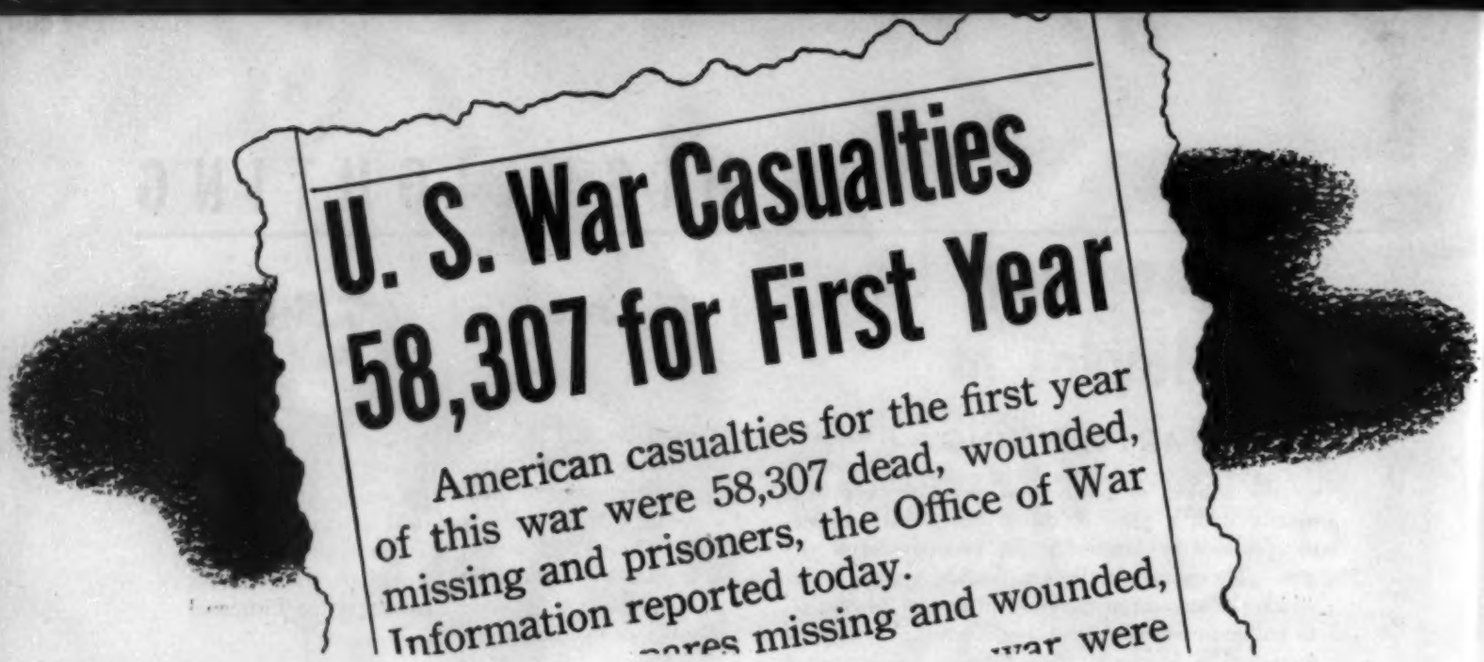
OTHER NEWS As might have been expected, the report of the Truman Committee on the steel situation is a caustic one in which criticism of the war effort is dealt out impartially to most of the government agencies involved, also to the large steel producers (p. 50). The committee sees enough steel available by mid-year for the war effort but sees no assurance that essential civilian needs can be met. It recommends raising prices on scrap wherever that is necessary to get the scrap to market. It charges the War Production Board with failure to put to immediate use large inventories of steel.

Utilization of minute quantities of boron to improve hardenability of steel is growing rapidly. Research work is rapidly under way to fill in gaps in the knowledge about boron steel (p. 71). Just why this subject is under sharp censorship restrictions is a mystery for articles that appeared in German technical publications prove the Germans already had a good grasp of boron steel metallurgy as far back as 1937.

TECHNICAL Continuing his discussion on the functions of specifications in conservation and substitution, Professor Macconochie this week declares specifications represent one of the most important of war devices, a tool that can become potent in conserving the three elements so vital in war—time, materials and manpower. He points out (p. 80) that specifications classify and catalog materials, make it possible to practice conservation without sacrificing safety or effectiveness.

A. W. Wood (p. 84) describes a briquetting installation now being used by a Westinghouse plant to help feed the unit's foundry. Not only is it an important aid in salvaging operations, but it also is aiding materially in handling strategic scrap not used in the foundry, keeping it separated for immediate use.

The story of Eric H. Heckett, the man who is credited with having recovered many thousands of tons of scrap from old slag dumps of various steelmakers is related by George R. Reiss (p. 94). He tells about the "Dutchman's" efforts in trying to sell the steel companies on the salvaging idea several years ago.


U. S. War Casualties
58,307 for First Year
American casualties for the first year of this war were 58,307 dead, wounded, missing and prisoners, the Office of War Information reported today.
missing and wounded,
were

But, Home Front Accidents Exceed War Casualties . . . . over 150 to 1

Home front accidents are occuring at the yearly rate of about 100,000 killed and 9,000,000 injured. Compared with America's Army and Navy war casualties of 58,000 during the first year of war, the ratio is one fighter lost to more than 150 Americans killed, permanently disabled, or injured.

This ratio is tragic. It tells the grim story of lost war production—of thousands of planes, tanks guns, shell, that never will reach our fighting men.

Where do most home front accidents occur? Traffic and public accidents accounted for 53% of the total killed and 34% of the injured. Home accidents resulted in 30% of the deaths and 49% of the injured. On-the-job accidents accounted for 17% of the killed and 17% of those injured. Incidentally, these figures prove that workers are safer on the job than they are anywhere else.

Conservation of manpower is tremendously important, not only when men are on the job, but throughout all their *active day—on the street, at recreation, and at home.*

Inland, with one of the best safety records in the steel industry, is taking every possible step to conserve manpower—by maintaining a large and efficient safety department, and a thoroughly equipped clinic—by constantly coaching men on safety inside as well as outside the plant—by cooperating with local agencies, and by subscribing to the War Production Fund to Preserve Manpower.

Act now to conserve manpower and increase war production!

You can help by making sure that your Safety Program does not lag. Enlist today in the national crusade against accidents. Write for full information to the National Safety Council's War Production Fund to Conserve Manpower, Chrysler Building, New York, N. Y.

ARMY E NAVY

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas City

STEEL
February 8, 1943

Planning for the Future

Careful readers of STEEL will have noticed that beginning with the Jan. 25 issue, the "Windows of Washington" section has been devoted to a discussion of the activities of government and private agencies engaged in post-war planning. The third in this series of articles appears on page 60 of this issue; others will be presented in subsequent issues.

STEEL is emphasizing the subject of postwar planning at this time because its editors believe that American industry has a vital stake in the economy which will prevail in this country after the war. Industrialists, particularly, should be familiar with the type of thinking which is being directed toward post-war problems. They should know the motives which are behind the activities of the various groups which are participating in the planning.

The series in "Windows of Washington" is intended to supply this information. In essence, it is a special report to industry, to help industrialists to understand what is being done and to encourage them to contribute whatever they can to insure the most intelligent planning that is possible.

Some industrialists have been rather lukewarm toward postwar planning for two reasons. First, they felt that postwar problems could be held in abeyance until after the No. 1 job of winning the war had been licked. Secondly, they had gained the idea that postwar planning was a sort of visionary dream indulged in chiefly by government social reformers.

If these points ever were valid, they are not valid now. The major problems in connection with winning the war, while not completely solved, are sufficiently under control to permit qualified persons to be devoting careful thought to the future.

Secondly, as the current articles in STEEL show, postwar planning is not the brainchild of theorists alone. Every important group in American economy is represented.

Enterprising industrialists will do two things about postwar planning. They will inform themselves concerning it. Once informed, they will take an active part in it.

E. L. Shaner
Editor-in-Chief

Steel Supplies Adequate for Direct Military Requirements

Essential civilian needs may not be filled. . . Senate committee criticizes armed services, War Production Board and larger producers. . . Shortage in alloys to continue until late 1943

WASHINGTON

STEEL production in 1943 and thereafter probably will be sufficient for military purposes, but there is no assurance that needs of essential civilian industries will be filled.

This view was expressed by the Truman committee last week in an interim report to Congress on the steel industry —a report sprinkled liberally with criticism of the Army, Navy, WPB and larger companies of the industry for alleged responsibility for the shortage in steel supply.

As for the outlook, the committee stated that "the present prospects for overall ingot tonnage may be viewed without undue alarm, although not with complacency." At the same time, a continued shortage until late 1943 of castings and of electric furnace alloy steels, particularly those requiring special heat-treating facilities and other special facilities, was predicted.

While the investigating body admitted it is too late to talk of readjusting the basic steel expansion program—with which it found much fault—it made various recommendations for utilizing existing capacity to the fullest. Among these suggestions were:

Urges Relaxed Specifications

1. Re-examine steel specifications with a view of elimination of too exacting requirements. Sizes and grades should be standardized, and NE steels should be used more extensively.
2. Substitute centrifugal and pressure castings for many types of forgings.
3. Use open hearths more extensively in alloy steel production.
4. Limit output of mills to those items for which they are best suited.
5. Place ultimate control over collection of scrap with the Steel Division, with power to issue directives to the Salvage Division and to insist that OPA fix prices high enough to induce scrap dealers to go out and get scrap.
6. Give more representation to labor and small mills on important committees of the Steel Division.

The armed forces, big steel companies and WPB all had a hand in delaying steel capacity expansion and causing the current steel shortage, the committee charged.

"As late as November, 1941, the armed forces estimated their steel requirements at a total figure much smaller than their present demands," the report stated. "They are now using as much steel in three months as they previously informed the Office of Production Management they would need in a year.

"The much-discussed Gano Dunn report concluded in February, 1941, that the then existing capacity would be sufficient for both military and civilian needs on the basis of these low estimates of military requirements. The sights were indeed set too low, and this should have been evident to reasonable men. Throughout 1941 the Army and Navy Munitions Board freely granted necessary priorities for new end-product plants but refused clearance for raw-materials facilities to feed these plants."

SENATOR HARRY S. TRUMAN

Chairman, Special Committee To Investigate the National Defense Program. Other members: Senators Tom Connally, Texas; James M. Mead, New York; Mon C. Wallgren, Washington; Carl A. Hatch, New Mexico; Harley M. Kilgore, West Virginia; Ralph O. Brewster, Maine; Harold H. Burton, Ohio

Desire of big steel companies to prevent any expansion that might react unfavorably against their control of the industry after the war was another cause of the delay, according to the committee.

Leading interests were said to have feared the competition of smaller companies which might be strengthened by wartime expansion, and through their domination of the Iron and Steel Branch of WPB were able to concentrate practically all of the belated expansion among the eight largest companies.

The third contributing factor to the present condition, in the committee's opinion was the delay of WPB in converting industry to a war basis, thereby permitting untold tons of steel to be consumed in nonwar production until far into 1942.

The Army and Navy also were criticized for the alleged lack of balance of certain types of facilities in the expansion program. Without attempting to explain how the armed forces are supposed to anticipate changes in war strategy far ahead, the report pointed to the overcapacity in armor plate as an instance of poor planning.

Scrap Collection "Haphazard"

Scrap collection was described in the report as having proceeded haphazardly and as the most serious of the unsolved problems. The Salvage Division of WPB is organized along lines designed to conduct a salvaging job and has not been able to seek out and find scrap, it was stated.

Scrap dealers were said to be hampered by the labor shortage, complicated regulations, stringent specifications, too much red tape and by scrap prices which are too low to enable them to develop new and remote sources of supply.

"Sponge iron experiments cannot be expected to produce any substantial quantities of substitute scrap in 1943, even if wholly successful. The most that could be expected from sponge-iron development for the purpose of producing synthetic scrap would be volume production in 1944 or 1945.

If we knew that we could count on such production, we could use our existing supplies of scrap freely and rely on sponge iron for the future; but we have no such knowledge. Scrap collection and utilization, therefore, continue to be of vital importance."

In most of its discussion of the sponge iron process, the Truman Committee displayed a conservatism that had been definitely lacking in previous opinions expressed by congressmen on the subject. The group admitted that "it is not en-

tirely clear that any of the processes will prove successful for large-scale operations."

However, it took the opportunity to remark that "the War Production Board's experience with sponge iron is indicative of its unwillingness to originate and sponsor experimental projects," and that "the Steel Division made no effort to sponsor a synthetic scrap project and limited its action to formulating objections to projects proposed to it."

Bessemer converters have a new usefulness in the scrap shortage, in the committee's opinion. In this respect the senators merely agreed with the increased use of these units in producing synthetic scrap and in duplexing processes.

In discussing the availability of stocks of idle and frozen steel in consumers' hands, the committee indicated that millions of tons are on hand. "The War Production Board knows just where to find it, yet to date most of it is still unused and deteriorating, rusting usually in the open air." It was added that an organized effort to move these stocks began the latter part of 1942 and is now under way.

"Other serious problems to be solved," the report continued, "are the present waste of scrap due to failure of steel fabricators to segregate the various classes of scrap and due to the failure of the industry to absorb alloy steel turnings.

"The steel companies advise that they cannot utilize over 40,000 tons a month with present facilities for preparing the scrap for melting. The Iron and Steel Branch and the Industry Advisory Committee were advised a year ago that there would be 100,000 tons a month, but practically nothing has been done to handle this quantity.

"No Halfway Measures"

"This is no time for halfway measures. The entire steel scrap collection program should be revamped."

Discussing the regulation of steel production, the committee pointed out that some items, which should be used extensively, are not in demand because of the price structure.

"Low alloy steels sell at prices higher than high alloy steels, with a resultant waste of the alloying elements in cases where carbon or low-alloy steel would be satisfactory; the various ferroalloy prices result in a tendency to produce the most profitable products rather than those which help the most in conservation.

"The solution of this problem is in the hands of the Office of Price Administration."

Correction in seasonal swings in production of certain steel products was recommended. In the case of tin plate it was suggested that orders be placed well in advance and production be spaced so as to avoid peaks and depressions. The committee also reiterated a previous recommendation that small sheet mills having a limited range of products be given orders which would enable them to continue in business and at the same time release for other work facilities and employes of large mills with varied operations—to the extent of the work that can be given to smaller mills.

"Bessemer steel capacity is not being fully utilized to date. In connection with the discussion of scrap in this report, the committee concluded that bessemer converters would be most useful where duplexed in operation with open-hearth and electric furnaces.

"This is possible only where the two are close enough to permit the feeding of hot steel from the bessemer to the open-hearth or electric furnace. But there are many bessemer converters in places where such duplexing would not be feasible, and these are not producing up to capacity. This steel is not suitable for most military purposes, due to its lower ductility.

"Nevertheless, it can be used to fill many essential needs which otherwise would go unfilled. Pre-war specifications, however, shunned bessemer steel, and the armed forces and industry in general have not yet been willing to use it for purposes where they were accustomed to use open-hearth steel. Bessemer should be specified wherever possible."

In pointing out some of the weaknesses of the old priorities system, the Truman group called for the Steel Division to check very carefully accumulations of large inventories.

"The armed forces, and some Navy shipyards in particular, have supplies on hand for many months, in some instances for eight or ten months. Each case should be examined to determine whether, without prejudice to the war effort, the steel could be put to immediate use and replaced by later production.

"With programs as important as the synthetic rubber, oil pipe line, shipbuilding construction, and farm machinery begging for steel, we cannot afford to wonder where steel ingot is going."

The Truman report was not wholly critical. H. G. Batcheller, Steel Division director, was commended for progress in the management of the steel situation in recent months, while in commenting on the expansion in steel plant and transportation facilities it was stated that "only a well organized and vigorous industry could do this job."

Summary of Truman Committee's Report

Almost all strategic materials shortages could be relieved sooner if we had steel. Specifically these shortages affect programs for aviation gasoline, synthetic rubber, shipping and aircraft.

Sufficient amounts of steel for military purposes will be available on completion of the expansion program by mid-year. There is no assurance that we will be able to fill the needs of essential civilian industries which will have a two-year backlog of needed repairs, replacements and additions.

Three factors responsible for the steel shortage: Underestimation of requirements by the armed services; opposition of large steel producers to over-expansion; delay of WPB in converting industry to war basis.

Recommendations: Specifications should be re-examined to eliminate too exacting requirements. NE steel alloys should be used more extensively.

Centrifugal castings and pressure castings should be used more freely as substitutes for forgings and rolled bars.

Bessemer steel capacity should be more fully utilized, especially in duplexing operations with open-hearth and electric furnaces.

Steel inventories of pre-war industries, particularly the automotive, should be directed into war or essential civilian uses.

Ultimate control over steel scrap collection should be placed in the WPB Steel Division, which should have power to issue directives to the Salvage Division and insist the OPA fix prices high enough to induce the scrap dealer to go out and collect it.

Miners' Demand for $2 Increase Spearheads Attack on Wage Freeze

ORGANIZED labor's formal assault on the wage stabilization program opened last week as John L. Lewis' United Mine Workers announced they would demand a $2 a day increase for bituminous coal miners and probably a similar raise for anthracite miners.

Meanwhile other union leaders, notably Philip Murray, CIO president, and William Green, AFL chief, indicated they soon would ask increases for their members. Agitation for a general increase in steel wages already has been started informally by the United Steelworkers of America-CIO. The International Ladies Garment Workers Union-AFL is seeking a substantial increase and more than 1,000,000 railroad workers are asking raises of up to 30 per cent.

If granted, these increases will mean the end of the "Little Steel" wage formula established by the War Labor Board which would permit increases as high as 15 per cent above the Jan. 1, 1941 levels. The demanded raises also would mean the scuttling of the administration's loudly-heralded anti-inflation program.

Interested Only in Raise

John L. Lewis, harsh critic of most administration policies since his break with President Roosevelt, expressed complete indifference to the "Little Steel" formula and the anti-inflation program.

"I have no comment on the future of the WLB," he said. "I'm only interested in obtaining the $2 raise for bituminous miners." Conferences between the miners' union and the coal operators will open in New York March 14; the present contract expires March 31 and if a new contract has not been signed by that time, the miners in all probability will cease work.

Demands for higher wages and the scrapping of the "Little Steel" yardstick were justified by union leaders on the grounds that the cost of living increase has been outstripping wage increases. Secretary of Perkins last week issued a widely-publicized statement that the cost of living has increased 21.3 per cent since the outbreak of the war in Europe. Fortuitously, this announcement was timed just to precede the unions' demands for wage increases.

Many observers, however, believed that the March 15 income taxes, to be felt by many unionists for the first time, was a more compelling reason for the wage demands than the higher cost of living

While the new wage demands were threatening the entire stabilization program, WPB Chairman Donald M. Nelson proposed to the Senate Military Affairs Committee that the standard work-week be increased to 48 hours. This in effect, he said, would add the equivalent of 500,000 new workers to the labor force, thus helping to alleviate a critical manpower shortage.

1942 Steel Payrolls at Peak; 12% Above 1941

Payrolls of the steel industry reached a new peak of $129,368,000 for December 1942, bringing the total paid out in 1942 to a record-breaking $1,467,059,000, according to the American Iron and Steel Institute. The payroll was more than 12 per cent above the prior record of $1,301,348,000 in 1941.

December payrolls were considerably higher than the November total of $122,816,000 and exceeded the former monthly peak of $126,627,000 reached in October 1942. In December 1941, payrolls amounted to $117,221,000.

The number of employes in the industry in December was higher than in the previous month, averaging 633,000 against 632,000 in November. In December 1941, the industry had 646,000.

Over the whole of 1942, the industry employed an average of 647,000, with a peak of 659,000 in June. In 1941, the average was 633,000.

Wage-earning employes earned an average of 109.4 cents an hour in December, against 109.3 cents in November, and 99.9 cents in December, 1941.

An average of 40.2 hours a week was worked by wage earners in December, compared with 39.4 in November, and 38.2 hours in December 1941.

WLB Bypasses "Hiring Hall" Issue for Lake Sailors

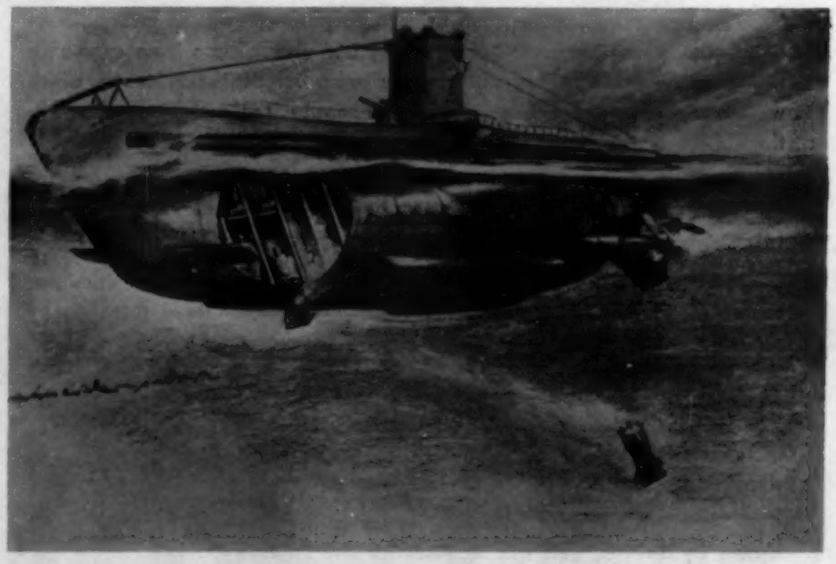
National War Labor Board last week ordered a wage increase of $22 per month for unlicensed personnel on Great Lakes vessels to eliminate inequalities. The order is retroactive to last August.

This was one of two important War Labor Board actions concerning Great Lakes shipping announced.

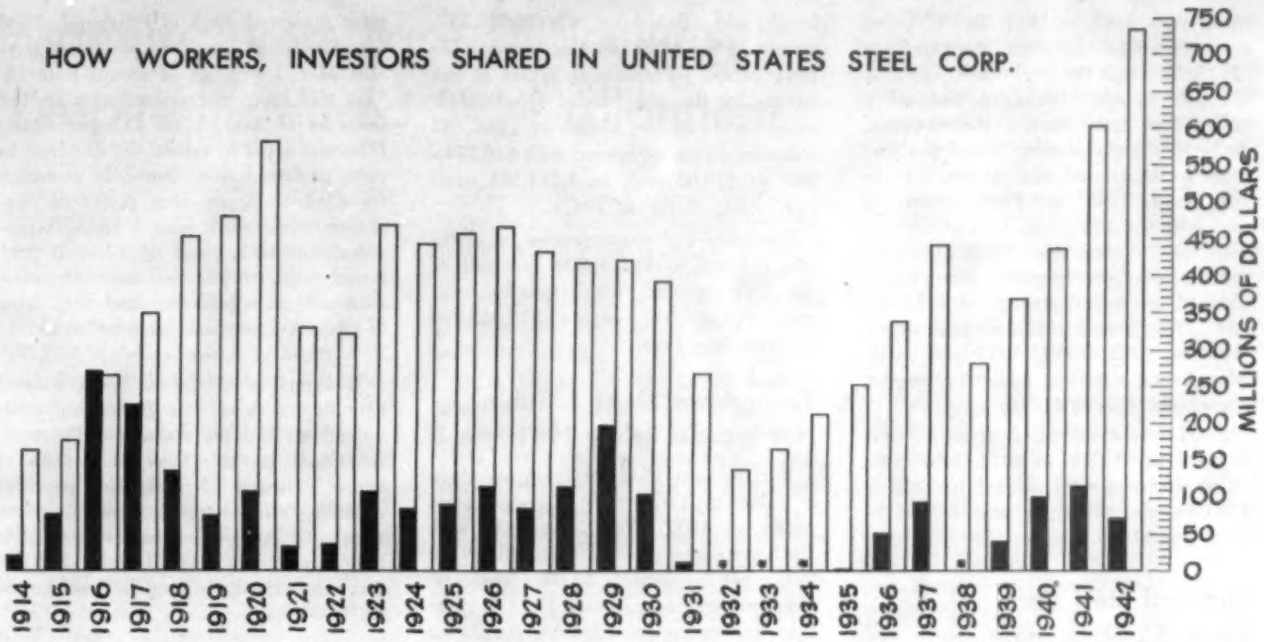
The other directs four iron ore vessel operators and CIO National Maritime Union to attempt to settle by negotiation the union's demand for preferential employment of its members.

The companies are Interstate Steamship Co., Bethlehem Transportation Co., International Harvester Co. and Inland Steel Co.

GERMAN PICTURE PURPORTS TO SHOW HOW MINES ARE LAID



NAZI submarines harass United Nations vessels by laying mines, as well as by direct torpedoing, according to this illustration and description "from a German source." The mines are "planted" from slotted chambers in the undersurface of the submarine, and this—it is said—can be done with little danger as the vessel remains beneath the surface. NEA photo



Black bars show net earnings; white bars, total payrolls. Stars indicate deficits in 1932, 1933, 1934 *and* 1938. *Note that profit exceeded payrolls in* 1916, *just before United States entered first World War. Also, striking similarity in columns for* 1920, 1941

Payrolls Now Ten Times Net Profit; Sharp Contrast to First World War

LABOR'S and government's shares in the earnings of the steel industry have shown a progressive increase over the past three decades, a study of the financial history of the United States Steel Corp. shows.

In 1942, the corporation's payrolls were more than ten times its net income. In 1916, the corporation's best profits year, net income was greater than total payrolls.

In 1942, taxes provided for by the corporation totaled more than three times the net income. In 1916, all taxes took less than one-tenth of earnings.

The year 1916, of course was an unusual year. America had not yet entered the war, although the steel industry was benefitting from an increased volume due to heavy orders from the Allies. Wages were only starting their upward spiral and the impact of wartime taxes had not yet been felt.

However, in 1918, the corporation's highest tax year to date, net income was nearly half of taxes. Payrolls, reflecting the wartime inflation, were three and one-third times the net profit, as compared with ten times the 1942 earnings under similar conditions.

Over the 29-year period starting in 1914, the corporation showed net earnings of $2,391,859,152, or an annual average of $77,751,623. Aggregate payrolls for the same year were $10,845,058,093, an annual average of $373,967,520, or about five times the average annual profits. Taxes for the period totaled $2,170,700,000, an annual average of $74,851,724, or less than the average annual profits.

Average wage of Big Steel's workers, including the general administrative and selling force, was $2191 in 1942, com-

COMPARISON OF U. S. STEEL'S NET INCOME AND PAYROLLS

Year	Net Income	Total Payroll	Average Number of Employes	Employes' Average Annual Earnings
1942	$ 72,142,195	$735,981,326	335,866	$2,191
1941	116,171,075	601,117,053	304,248	1,975
1940	102,211,282	438,621,292	254,393	1,724
1939	41,119,934	368,577,711	223,844	1,646
1938	7,717,454*	282,209,332	202,108	1,396
1937	94,944,358	442,718,351	261,293	1,694
1936	50,583,356	338,866,121	222,372	1,523
1935	1,146,708	251,576,808	194,820	1,291
1934	21,667,780*	210,503,533	189,881	1,108
1933	36,501,122*	163,149,503	172,577	945
1932	71,175,704*	133,912,809	158,032	847
1931	13,038,140	266,871,413	203,674	1,310
1930	104,421,571	391,271,366	211,055	1,853
1929	197,592,060	420,072,851	224,980	1,871
1928	114,173,774	413,699,720	221,702	1,866
1927	87,896,836	430,727,095	231,549	1,860
1926	116,667,404	467,409,446	253,199	1,846
1925	90,602,652	456,740,355	249,833	1,828
1924	85,067,191	442,458,577	246,753	1,793
1923	108,707,064	469,502,634	260,786	1,800
1922	39,653,455	322,678,130	214,931	1,501
1921	36,617,017	332,887,505	191,700	1,736
1920	109,694,227	581,556,925	267,345	2,175
1919	76,794,582	479,548,040	252,106	1,902
1918	137,532,377	452,663,524	268,710	1,684
1917	224,219,564	347,370,400	268,058	1,292
1916	271,531,730	263,385,502	252,668	1,042
1915	75,833,832	176,800,864	191,126	925
1914	23,496,768	162,379,907	179,353	905

*Denotes loss.

pared with $905 in 1914. In 1920, the average annual earnings amounted to $2175, although the work-week was considerably longer. Wages maintained a fairly even level during the twenties, declined sharply during the depression years to an annual average of $847 in 1932 and $945 in 1933, recovered sharply since 1936.

In the 11 years since 1932, aggregate earnings of the corporation were $341,256,848, an annual average of $31,256,349. This period included four deficit years in 1932, 1933, 1934 and 1938, when losses, met from undivided surplus, aggregated $137,062,060.

Employment increased from 179,353 in 1914 to 335,866 in 1942. Low point in employment was touched in 1932 at 158,032, about 30 per cent below the boom year 1929.

National Steel Corp. Earns $5.41 a Share

National Steel Corp., Pittsburgh, in a preliminary statement, reports net earnings for 1942, after all charges including a reserve of $2,000,000 for contingencies and post-war adjustments, of $11,929,867, equal to $5.41 per share on the capital stock, compared with $17,102,350, which equaled $7.75 per share, in prior year.

Provision for federal income and excess profits taxes of $30,300,000. was made in 1942, compared with $19,825,000 in 1941.

Net earnings for the fourth quarter were $3,664,701, against $4,180,078 in like period of 1941.

Republic Steel Corp. Earns $17,154,578 in 1942

Consolidated net profit of Republic Steel Corp., Cleveland, for 1942 amounted to $17,154,578, after all deductions including provision for federal income and excess profits taxes, equal to $2.67 per share on the common stock. This compares with $24,038,340 for the previous year and with per share common stock earnings of $3.87 in 1941.

Total provision for taxes in 1942 was $67,875,000, compared with $46,250,000 a year before.

Company's total sales were valued at $521,110,835, against $483,812,368 in 1941. With increased steel capacity the rate of production for the year was 99.6 per cent, compared with 99.5 per cent in 1941 of capacity then existing.

Fourth Quarter Earnings of Jones & Laughlin Reduced

Fourth quarter 1942 net income of Jones & Laughlin Steel Corp., Pittsburgh, and subsidiaries, was $2,550,257, against $4,234,599 in the comparable 1941 period. Preliminary report of net income for the year totaled $10,020,443, equal to $4.42 per share on 1,602,467 common shares, compared with $16,274,983, or $10.85 each on 1,311,161 common stock shares in 1941.

Provision for contingencies in 1942 was reduced to $1,000,000, one-half of the 1941 amount. Total taxes last year were $24,000,000, against $14,342,670 in preceding year.

Youngstown Sheet & Tube Net Income Below 1941

For the year 1942, Youngstown Sheet & Tube Co., Youngstown, O., reports net profit of $10,305,705, compared with 1941 net earnings of $16,124,401. Last year's net is equal to $5.66 a share on the common stock, against $9.13 in prior year. Company provided $4,920,000 for federal normal income tax and $19,780,000 for excess profits taxes, contrasting with $8,127,000 and $13,373,000, respectively, in 1941.

Interlake Iron Profit Drops 50 Per Cent

Interlake Iron Corp., Chicago, earned net income in 1942, after charges, of $1,241,931, according to preliminary statement. This equals 62 cents per share, and compares with $2,406,486, or $1.20 a share in 1941. Charges in 1942 included a contingency fund of $210,000. Company's funded debt was reduced during the year by $2,269,000, and now stands at $2,724,000.

Carpenter Steel 's Net Profit $367,538 for Last Quarter

Net profit of Carpenter Steel Co., Reading, Pa., for the quarter ended Dec. 31 totaled $367,538 after charges, federal taxes based on the 1942 tax law and after setting up an additional $300,000 reserve for undeterminable taxes and other contingencies. Net is equal to $1.02 a share on the capital stock. Earnings compare with net of $522,136 in the December quarter of 1941.

Dividends

American Rolling Mill Co., Middletown, O., has authorized dividend of 20 cents, payable Mar. 15 to stock of record Feb. 15. Last year the company paid 25 cents each on Mar. 15 and June 15, and 20 cents each on Sept. 15 and Dec. 16.

—o—

Pittsburgh Steel Co. Dividend of $4.125 on the first series 5½ per cent prior preferred stock of Pittsburgh Steel Co., Pittsburgh, has been declared, payable Mar. 1 to stock of record Feb. 16 This will leave an accumulation on the issue as of Mar. 1 of $11 per share. Directors acted to extend the dividend to prior preferred stock issued in exchange for Class B-7 per cent preferred. Exchange offer, which expires April 30, provides that each share of Class B preferred is equivalent to four-tenths of a share of prior preferred and one share of Class A-5 per cent preferred stock.

—o—

Directors of Wickwire Spencer Steel Co., New York, on Jan. 28 declared a dividend of 50 cents a share on the common stock, payable March 1 to stock of record February 15. Immediate payment of $250,000 on long-term bank loans to anticipate fixed amortization payments due July 1, 1943, and January 1, 1944 was authorized, leaving a balance of $875,000.

Asks Freight, Passenger Rate Increases Be Rescinded

Emergency freight and passenger rate increases granted the railroads early last year have cost the American people $300,000,000 in 1942 and will cost them $400,000,000, in 1943 unless revoked, the Interstate Commerce Commission was informed last week.

The charge was made at the opening of hearings on the petition by Director of Economic Stabilization Byrnes and Price Administrator Brown to have the emergency increases rescinded.

Attorney Max Swiren, special counsel to Byrnes and Brown, asserted in his opening statement to the commission that this extra burden is being placed on the consuming public at a time when military and industrial mobilization have pushed railroad traffic and revenues "to the highest point in railroad experience."

Plans for Argentine Iron Industry Approved

Argentina has approved a plan for the development of an iron industry in the province of Jujuy, according to a report to the Department of Commerce. The present project is regarded as experimental. Production will be but a small percentage of the country's requirements.

Exploration work with the iron deposits in Zapla indicates the mine can produce 50,000 tons of ore annually. The ore will be treated at blast furnaces, now under construction in Palpala, which will have an annual capacity of 20,000 tons of pig iron.

Manufacturers Face Difficulties Despite Increased Steel Allotment

CHICAGO

DESPITE the fact that WPB late in January approved an accelerated program for the farm equipment industry for 1943 and raised the first quarter allotment of steel from 137,000 tons to 187,000 tons—an increase of 50,000 tons, or approximately 30 per cent—manufacturers doubt material can be obtained in time to accomplish this object.

This viewpoint is premised on the industry's inability to obtain adequate supplies of steel in the last quarter of 1942 and thus far in the first quarter of this year, also the fact the 50,000-ton increased allotment is confined to types of steel not now employed in equipment manufacture. Implement makers must determine not only how the new types can be substituted for the old advantageously, but whether mills can supply them promptly. In many cases, new sources must be found.

First reports stated that the 50,000 tons of additional steel was to be bessemer, but it has since been revealed the revised schedule specified "bessemer and/or rerolled rail" steel. Neither of these grades have been used in farm implements for many years, although at one time they were utilized in significant amounts. Practice in recent years has been to use open-hearth carbon steels and alloy steels.

In a statement on the farm machinery situation just issued by International Harvester Co., Chicago, Fowler McCormick, president, explains his company considers itself to have two wartime duties in the production of farm equipment. First is to make available to WPB, or other governmental agencies, information as to equipment needs of American farmers, and second is to do its utmost to carry out successfully whatever program of armament and farm equipment production was then laid down by the government.

"We recognize fully that in these times of scarce materials it is not possible to provide all the new farm equipment which farmers would readily buy if it were available," Mr. McCormick states. "On the other hand, it is equally clear that farmers, who are experiencing loss of farm manpower and facing higher government goals for crop production, have certain minimum equipment needs which must be met. If these needs are not met, the production of food will inevitably suffer.

"Opinions naturally differ as to what these minimum needs are and where the danger line lies. Our information and our opinion have generally been in substantial agreement with the views expressed by the Department of Agriculture, so far as quantities of machines are concerned.

"We have always considered that the amounts of farm machinery provided for in limitation order L-170 were inadequate to meet farmers' minimum needs. We have always considered that the long delay in issuance of the order would prove to be most serious. In addition, we have always urged that manufacturers be given sufficiently high priorities to procure the materials needed to build whatever quota of farm machines the government desired, in time to meet farmers' needs.

"There have been in recent days several statements by government officials to the effect that manufacture of farm machinery and repair parts under L-170 would be accelerated and that some additional upward revisions would be made

Farmers are experiencing difficulties in keeping worn implements and equipment in repair to handle the increased demands for foodstuffs. Farm workshops are being utilized heavily. Above, left, an Ohio farmer reconditions a mower knife. At right, home repairs are administered to a manure spreader axle

as to specific machines and repairs. Immediately following these statements, our company made applications to the government for the materials necessary to provide these additional machines and repair parts. We have been informed, however, that these materials for the proposed accelerated program would not be available for manufacture for the first quarter of 1943. For the present, therefore, the L-170 program cannot be accelerated, insofar as International Harvester Co. is concerned, nor can any additional machines or repair parts be manufactured, unless and until materials are made available."

Concluding his statement, Mr. McCormick said: "We hope a new program, more balanced and more adequate, can be determined by the government in the near future as the basis for operations of this industry over a period of at least 12 months. It is of the greatest urgency that such a program be effective not later than March 15, for farming is a seasonal business and the seasons come and go without regard for the difficulties which tend to delay human decisions.

"We consider that production of food is as vital to the winning of the war as is the production of weapons and material for the Army, Navy and Marine Corps. Farm machinery plays a most important part in the production of this food at any time, and particularly in war-time when the manpower supply is reduced. It is therefore essential that an adequate supply of machines must be provided, and on time."

"Nucleus Plant" Program Discussed

In his annual report to stockholders recently, Cal Sivright, president, Oliver Farm Equipment Co., Chicago, commented similarly, but went further in pointing out that the "nucleus plant" program, which in theory leaves the bigger companies free to concentrate more intensively on war work, has not been working out too well. Mr. Sivright stated:

"The company believes that the advisability of concentrating industry in the manner established by order L-170 is questionable when viewed in the light of its effect on the war effort. The plan complicates the problem of farm equipment production, transportation, distribution, and maintenance.

"The company further believes that more, new power-farming, labor-saving farm equipment is needed by the farmers of the United States than is provided by the limitation order if the food supply of this nation and its allies is to be adequately maintained."

WPB has advised farm machinery manufacturers that their PD-25A and PD-25F applications received up to late January, covering first quarter requirements and materials on order but undelivered in fourth quarter of 1942 had taken up practically the full amount of steel allocated for first quarter, consequently, the PD-25F applications received in connection with a properly "accelerated" manufacturing program were being denied.

Desired Delivery Possible

Manufacturers are informed that material required for second quarter delivery should be applied for on application forms CMP-4B by Feb. 9. The instructions stated further that the industry is being required to purchase at least 25 per cent of its steel as "bessemer and/or rerolled rail" steel. This will relieve pressure on open-hearth steel, and since there is at present excess productive capacity for the two types, this offers an opportunity to secure desired delivery.

Since not all mills can furnish bessemer or rerolled rail, implement manufacturers are obliged to find their own sources of supply.

Advice from WPB also is to the effect that since certain machinery production cannot be met with bessemer or rerolled rail steel, each manufacturer who can do so should purchase at least one-third of his steel in these classifications to maintain an overall 25 per cent for the entire industry. Orders for first quarter should specify these steels to the greatest extent possible.

It is pointed out that the increase in the manufacturing program for 1943 had been considered favorably because of the assurance of the Materials Requirements Committee that manufacturers can and will use the specified quantities of bessemer and rerolled rail steel.

Farm machinery manufacturers appear to agree that they can utilize bessemer and rerolled rail steel up to 25 per cent of their total steel use, providing they can locate sources and get it rolled. Applications would be confined almost exclusively to nonfunctional parts, such as frames, structural members, and the like. Certainly neither grade would be used in functional applications, such as engines and parts.

It is likely that rail steel will be more readily obtained than bessemer, but in any event, it is improbable that implement production can be expanded in first quarter. Inability of manufacturers to obtain adequate material already has retarded output to a point that will prevent exceeding previously established quotas.

Although their rolling operations are currently at a low level, due partly to weak product demand and partly to a government-imposed work week of not over 40 hours, but with an adequate supply of rails on hand, rail rerolling mills probably can handle a fair amount of farm implement business if it is offered to them.

Principal product of rail mills at present is concrete bars, but bar demand has declined almost to the vanishing point because of the current restriction on building construction. As a result, rail mills are in a position to produce a variety of bars and light sections, such as angles, tees, channels, and the like. Sheets cannot be rolled from rails, and this is a limitation insofar as the agricultural implement industry is concerned.

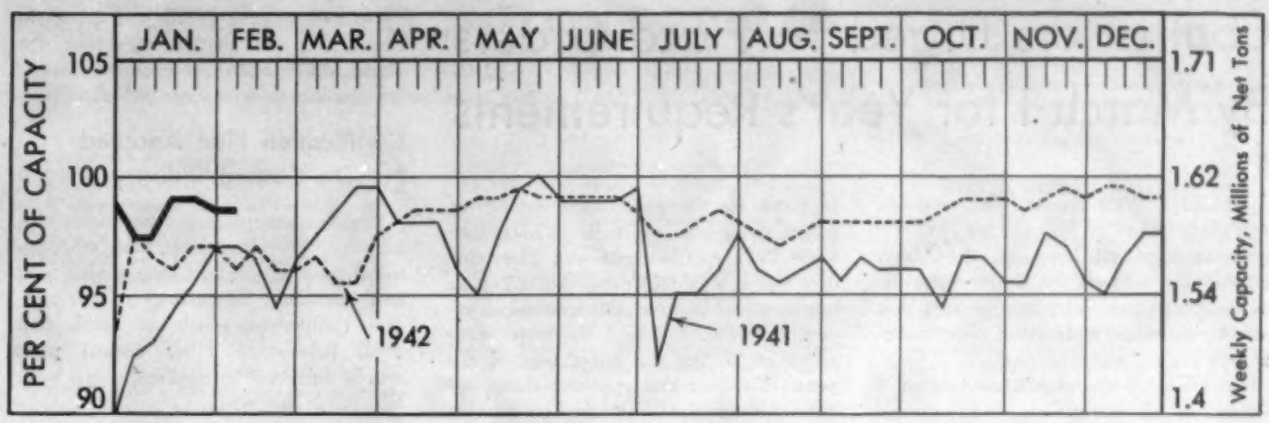
As for bessemer steel, there is a widespread belief that it is an inferior product, as compared with open hearth. As a matter of fact, bessemer cannot be excelled for certain purposes, and its manufacture in recent years has been improved to a point where it is a quality product. The combined effect of oxygen, nitrogen, phosphorus and sulphur, which usually are higher than in open-hearth steels, is to impart certain distinctive and useful properties, which manifest themselves in cold working and machining operations.

Bessemer Superior in Machining

As compared with ordinary basic open hearth, bessemer is far superior in machining, exhibits a greater stiffness, is more sensitive to cold work, differs in hot working properties, and generally shows a somewhat higher yield point for the same tensile strength. While bessemer is not generally considered among heat treating steels, a high sulphur type has been used for carburizing and has proved satisfactory for all purposes not requiring an extremely tough and ductile core. In the standard carburizing (McQuaid-Ehn) test, bessemer steels of the usual grades are as a rule abnormal and vary considerably in grain size.

Bessemer steel is unexcelled for screw stock, for certain kinds of wire, for many classes of sheets, for many grades of lap and butt weld tube and pipe, also bars for bolts and nuts, concrete reinforcing, and small structural and special shapes. Principal uses which the agricultural implement industry might make of bessemer are sheets, bars, structural and special shapes, and bolts and nuts.

Applications, however, will have to be selected carefully. Bessemer, on the whole, is subject to embrittlement and cold weather temperatures; and actual contact with the soil makes it susceptible to corrosion. Sheets 16-gage and heavier may crack in brake forming, but little trouble of this nature is to be expected with 18-gage and lighter.



STEEL INGOTS . . . *STEADY*

PRODUCTION of open-hearth, bessemer and electric furnace ingots last week was unchanged at 98½ per cent of capacity. Two districts advanced, four declined and six were unchanged. A year ago the rate was 96 per cent; two years ago it was 97 per cent, both based on capacity as of those dates.

Buffalo—Dropped 2½ points to 90½ per cent as Republic Steel Corp. was forced to withdraw one open hearth for repair. Other producers held their previous level.

St. Louis—A fractional gain by one interest advanced the district rate 1 point to 98 per cent.

Youngstown, O.—With 77 open hearths and three bessemers in production the rate continued at 97 per cent, which has prevailed for three months. All 26 blast furnaces are blowing.

Cincinnati—Held at 95 per cent for third week. Two producers are at 100 per cent.

Pittsburgh—Gained ½-point to 97½ per cent on slight shifting of active units.

Wheeling—Off 3 points to 79½ per cent.

Detroit—For the fourth week steel production was at 93 per cent, two open hearths being down for repairs.

Chicago—Furnace repair forced production down another ½-point to 100 per cent, the lowest since the second week in January. Scrap no longer is a limiting factor.

Cleveland—Slight change by one interest caused a drop of ½-point to 91½ per cent.

Central eastern seaboard—Unchanged at 94 per cent.

New England—Continued at 95 per cent for the fourth week.

Birmingham, Ala.—Unchanged at 100 per cent, 23 open hearths in service.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended Feb. 6	Change	Same week 1942	Same week 1941
Pittsburgh	97.5	+0.5	93	96.5
Chicago	100	—0.5	103	98
Eastern Pa.	94	None	90	96
Youngstown	97	None	88	95
Wheeling	79.5	—3	84	100
Cleveland	91.5	—0.5	84.5	84.5
Buffalo	90.5	—2.5	79.5	90.5
Birmingham	100	None	90	100
New England	95	None	92	92
Cincinnati	95	None	87	95
St. Louis	93	+1	78	93
Detroit	93	None	85	96
Average	98.5	None	*96	*97

*Computed on basis of steelmaking capacity as of those dates.

Scrap Melt Sets Record At 55,841,000 Tons in 1942

Consumption of steel and iron scrap by all classes of users in 1942 is estimated at 55,841,000 gross tons by the Institute of Scrap Iron and Steel Inc. This exceeded the prior record of 53,623,000 tons in 1941 by about 4 per cent. The highest peacetime consumption was 38,006,272 tons in 1937. Greatest tonnage melted during the first World War was 26,800,000 tons in 1917.

Of the 1942 tonnage approximately 31,000,000 tons was recycled or plant scrap and 24,800,000 tons was purchased or dealer scrap, from automobile wrecking, industrial scrap, railroads, salvage drives and other sources. In addition to the record consumption inventories were increased about 1,500,000 tons, the Institute estimates.

Coast Steel Mill Scrap Needs Rise to 1,668,870 Tons in 1943

Steel mill scrap requirements for 1943 in the six western states, California, Oregon, Washington, Idaho, Nevada and Arizona, will be approximately 1,688,870 tons, according to Merrill Stubbs, chief of the scrap processors branch, salvage division of the War Production Board. He recently made a survey of requirements and supply on the Pacific coast.

This estimate compares with consumption of 1,350,000 tons in this area in 1942. The increased requirement is due to opening of the Kaiser steel plant at Fontana, Calif., expansion of production by Bethlehem Steel Co. and Columbia Steel Co. and other new facilities.

Builders' Told Americans Will Spend 5 Billions for Housing

More than 1,000,000 American families intend to spend approximately $5,000,000,000 for housing, William J. Moll, field director, United States Chamber of Commerce, told the National Home Builders' Association in convention in St. Louis last week. He urged them to plan for this expected building program.

Rufus S. Lusk, Washington representative of the association, declared that public housing is "nothing more or less than socialism." Federal slum clearance projects have not achieved their announced objective, he said.

Tomorrow's homes can be planned and bought today and even be paid for with war bonds or monthly cash deposits under a new purchase plan developed by the St. Louis Builders' Guild, McCune Gill, vice president, Title Insurance Corp. of St. Louis, told the three-day Victory Conference.

Value of 29,300 new machine tool units produced during December was $131,929,000, according to WPB's Tools Division. Figures for the month bring total value of machine tool production for 1942 up to $1,321,718,000, an advance of 71.3 per cent over the 1941 production of $771,465,000.

Contractors Urged To Place Orders By March 1 for Year's Requirements

RECENT WPB request that contractors place orders by March 1 for 1943 requirements of all items on the Navy critical list is seen by some suppliers as creating unnecessary exaggerated demand causing widespread confusion among many manufacturers.

Branches of the armed services sent letters to all contractors and subcontractors asking them to complete purchases by Feb. 6 for first half of 1943 requirements of items appearing on the critical list compiled by the Resources Division of the United States Navy. The letter, signed by Charles E. Wilson, vice chairman, WPB, also asked the contractors to place orders for the last half of the year by March 1.

The critical list includes in part: Machine tools, cutting tools, motors, starters, controllers, generators, radio equipment, roller bearings, compressors, vacuum pumps, aluminum forgings, welding rods and diesel engines.

In placing orders covering the final six months of this year for these critical items it is felt there is bound to be a general exaggeration of needs, for any accurate forecast of requirements under present rapidly changing conditions is believed impossible. This may result in an artificial demand for these items and stimulate production beyond actual needs at a time when every effort is directed to the conservation of critical raw materials. The effect doesn't stop here, it is said, for a manufacturer of these products, noting a rise in demand, may have to purchase additional equipment to meet the apparent increased demand.

About a year ago a similar letter was sent out by the government asking all plants using machine tools to anticipate their 1942 requirements and place orders before a certain date. According to machine tool interests this resulted in excess ordering, followed by many cancellations during the latter part of the year. To meet this apparent sharp upturn in demand, machine tool production was pushed to the limit and many expansion programs inaugurated. In spite of the numerous cancellations during the closing months of last year, the WPB list of surplus machine tools produced under a pool arrangement for the government has been growing steadily in recent months. It is also reported that a considerable number of new tools are lying idle in defense plants.

Washington officials are said to be reconsidering the matter regarding the recent WPB letter. A statement clarifying the situation is expected shortly.

Certification Plan Adopted For Die-Casting Industry

Certification plan in the die-casting industry, providing a method whereby metal used in special (high) quality zinc and aluminum die-castings of ammunition components—such as bomb and shell fuses—and other critical parts will be subjected to rigid inspection went into effect last week.

Spectrographic and X-ray eye inspection of special quality zinc die-castings is required under the WPB certification plan. Spectrographic analysis of zinc die-castings is needed to assure the purity of the chemical composition of zinc alloys employed. The presence of certain impurities, such as lead or tin, in quantities of even thousandths of 1 per cent may cause the castings to fall apart.

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MILLION VOLT X-RAY EYE EXAMINES FORD M-4 TANK

A MILLION volts power this giant X-ray machine as it noses out the secrets of welds holding together the redoubtable "battle wagon," an M-4 tank, manufactured by the Ford Motor Co. at Detroit. The huge radio machine, which can be easily raised, lowered or tilted by the metallurgical testers here using it, takes more than 100 X-ray pictures of each tank as it comes off the line. NEA photo

PRIORITIES–ALLOCATIONS–PRICES

Weekly summary of orders and regulations issued by WPB and OPA, supplementary to Priorities-Allocations-Prices Guide as published in Section II of STEEL, Dec. 14, 1942

E ORDERS

E-1-b (Amendment): **Machine Tools,** effective Jan. 26. Freezes delivery schedules of machine-tool builders for a 60-day period. During this period schedules may not be upset or modified by higher-rated orders.

L ORDERS

L-30-d (Amendment): **Household Articles,** effective Jan. 26. Limits production of hand clothes wringers to units of 18 pounds or less, containing 50 per cent or less of metal by weight; restricts average quarterly use of iron and steel for such wringers to not more than 30 per cent of the average amount used quarterly in the year ended June 30, 1941. For use on board ship, order permits production of; coat hangers containing iron and steel in hooks only; iron and steel curtain rods, drapery hooks, toilet paper holders, and towel bars and racks.

L-78 (Amendment): **Fluorescent Lighting Fixtures,** effective Jan. 26. Restricts amount of metal that may be incorporated into fixtures for use with hot cathode tubes and bulbs, if manufactured after May 4, 1943. Forbids use of metal with certain exceptions after Feb. 9 in the manufacture of shields, louvres, or baffles for fluorescent lighting units. Following are permissible weights of metal that may be used in fixtures (exclusive of ballast, hanging or suspension devices) designed and constructed for: two or three 40-watt hot cathode tubes or bulbs, 3 pounds of ferrous metal; for two 100-watt hot cathode tubes or bulbs, 4 pounds of ferrous metal; two or three continuous parallel rows of 40-watt hot cathode tubes or bulbs, 3½ pounds of ferrous metal for each 4 linear feet of fixture; two or three rows of 100-watt bulbs, 4½ pounds per 5 linear feet of fixture.

L-159: Plastics Molding Machinery, effective Feb. 1. Provides for complete allocation, replacing previous General Limitation order L-159. Prohibits delivery except as specifically authorized by director general for operations; manufacture and assembling of machinery except to fulfill orders previously authorized for delivery by WPB. Exempts delivery of machinery assembled prior to Jan. 29, 1943. Delivery or maintenance of repair parts must be specifically authorized except: from inventory to repair breakdown; for maintenance of a minimum practicable working inventory.

L-187 (Amendment): **Cast Iron Boilers,** effective Jan. 26. Permits manufacture of low-pressure cast iron boilers for war housing and civilian replacement needs. Manufacturers may use in each of the first two calendar quarters of 1943 4.5 per cent of metal put into process during 1940.

L-193 (Amendment): **Conveying Machinery,** effective Jan. 21. Removes restrictions on purchase of used conveying machinery and mechanical power transmission equipment as well as use of critical materials in certain replacement and repair parts. Exempts belting and farm machinery from terms of the order. Adjusts provisions for the use of alloy steel in certain chains and parts to conform to WPB standards.

L-197 (Amendment): **Steel Drums,** effective Jan. 29. Prohibits use of drums for packing sand, water, bird seed and 11 specified chemicals. Adds 15 other chemicals which may be packed in steel drums if other containers are found impracticable. Exempts drums for repair and maintenance operations aboard ship; those exceeding 30-gallon capacity lighter than 23 gage; and containing materials incorporated in certain military items.

L-204 (Amendment): **Telephone Sets,** effective Feb. 1. Expressly makes subject to terms of the order intercommunicating telephone sets and systems. Manufacture of new telephone sets was stopped by the order in November, 1942, except for special types designed for combat use.

L-217 (Amendment): **Construction Machinery,** effective Feb. 1. Reduces number of sizes of portable jaw crushers and portable roll crushers from 63 to 29 within the nine size-range groups. Limits individual producer to a maximum of nine sizes, one in each group. Reduces sizes of portable roll crushers from 25 to 5. Permits only two types of portable jaw crushers instead of five.

M ORDERS

M-38-c (Amendment): **Lead,** effective Feb. 2. Removes exemption of orders with preference ratings of A-1-j or higher from the restrictions on the use of lead.

M-285: Uranium, effective Jan. 26. Prohibits sale and deliveries of uranium and uranium compounds for use in manufacture or decoration of glass, glassware, pottery, tile, or other ceramic products.

PRIORITIES REGULATIONS

No. 11 (Amendment) **and No. 11A:** Sets up procedures to govern PRP units during the period of transition from PRP to the Controlled Materials Plan in the second quarter. Extends into second quarter a basic percentage (in most cases 70 per cent) of first quarter PRP authorizations. After March 31 these PRP units, unless otherwise advised, will be permitted to apply first quarter ratings to the remaining 30 per cent of their first quarter authorizations. PRP units will not have to submit additional PD-25A applications for the extensions.

PRICE REGULATIONS

No. 125 (Revised): **Nonferrous Castings,** effective Jan. 27. Reduces prices 3 cents per pound for aluminum and magnesium and 1½-cents per pound for copper base castings. Adds new price base period of May 11, 1942, to Jan. 31, 1943, inclusive. Provides that current metal prices be used in pricing formulas when pricing castings of a different class than previously offered. Requires foundries to file their pricing formulas with OPA. Exempts from official price control all foundries that do less than $12,500 worth of business in a quarter.

No. 202 (Amendment): **Brass Ingot,** effective Feb. 1. Establishes ceiling prices on four new ranges of ingot and increases impurities limitations of two other ranges. Leaves level of prices unchanged. New alloy classifications are No. 257, added to Table 2; Nos. 296.5 and 299, added to Table 3; and No. 407.5, added to Table 4. Alloys whose ranges of impurities were widened are: No. 295 in Table 2 and No. 409 in Table 4.

No. 314: Magnesium and Magnesium Alloy Ingot, effective Feb. 1. Establishes maximum prices in cents per pound as follows: Commercially pure magnesium, 20.50; incendiary bomb alloy, 23.40; 50-50 magnesium-aluminum alloy, 23.75; ASTM B80-41T No. 11, 25.00; ASTM B94-40T No. 13, 25.00; all other alloys, 23.00.

Claimant Agencies Receive Metals Allotments for Second Quarter

WAR Production Board's requirements committee last week allotted to the 14 Claimant Agencies the amounts of steel, copper and aluminum to be delivered to manufacturers for production during the second quarter of 1943 under the Controlled Materials Plan.

"Allotments of tonnages of the three basic and critical materials, steel, copper and aluminum," Donald M. Nelson, WPB chairman, said, "provide for balanced production programs with the total requirements kept within supplies available during the second quarter.

"Full provision has been made in the allotments for the 'must' programs — synthetic rubber, high-octane gasoline, aviation, army materiel, merchant and naval shipping and escort vessels—as they currently stand. Less essential programs have been cut to the bone."

Agencies to which allotments were made follow: War Department; Navy Department; Aircraft Scheduling unit; Maritime Commission; Board of Economic Warfare; Office of Lend-Lease Administration; Office of Civilian Supply; Facilities Bureau; National Housing Administration; Petroleum Administrator for War; Office of Food Administrator; Office of Defense Transportation; Office of Rubber Director; Office of Power Director.

Details of the distribution among the various agencies is not available "for reasons of military security." It can be said, however, that the demand for each of the basic materials exceeded the estimated supply and programs were adjusted to keep the materials budget in balance. The over-all requests exceeded supply by approximately 17 per cent for carbon steel, 15 per cent for alloy steel; 16 per cent for copper and 14 per cent for aluminum.

Requests of the claimant agencies for the three controlled materials to be delivered during the second quarter were made in the first week of January in conformity with the CMP time table.

During the latter half of January the Requirements Committee held almost continuous conferences during which each program was studied by the claimants to assure approval only of requests that met the combined tests of essentiality. Each claimant, under this arrangement, was proponent of its own program and the critical analyst of all others.

WINDOWS of WASHINGTON

Many groups interested in postwar planning. . .
New Congress expected to appoint committees. . .
Legislation will be necessary to implement proposals for peacetime economy

IT should be understood from the discussions that appeared in this spot in the issues of Jan. 25 and Feb. 1 that of the three major bodies engaged in postwar planning, the Committee for Economic Development in no sense is concerned with overall national planning. Paul G. Hoffman, president, Studebaker Corp., South Bend, Ind., and chairman of the committee, made this clear recently when he said:

"This is an effort by business men to stimulate maximum productivity and high employment after the war. The success which business will have in providing a high volume of employment depends in part on conditions beyond its control. This fact, however, does not relieve any business man of the responsibility for exerting his own maximum effort to create and maintain as many real jobs as possible."

In brief, the Committee for Economic Development is concerned with getting industry, by individual companies and by local community groups, to prepare postwar products, postwar production schedules and to prepare to employ large numbers of people in production for peace. It is leaving the overall national planning to the National Resources Planning Board and the National Planning Association.

Many Groups Interested

In analyzing the national postwar planning program already set up, it is difficult to place credit where it belongs. While the National Resources Planning Board and the National Planning Association are the spark-plugs and clearing houses, a great many groups are actively interested in postwar planning. These include substantially all of the government departments and also private groups, such as the National Association of Manufacturers, Chamber of Commerce of the United States, Congress of Industrial Organizations, American Federation of Labor, Rotary International, American Legion, Twentieth Century Fund, Brookings Institution and many others.

As has been stated previously, community planning already is under way in Peoria, Ill., Reading, Pa., Rochester, N. Y., Wheeling, W. Va., Buffalo and Baltimore. The 78th Congress can be expected to appoint postwar planning committees if plans of the House majority and minority leaders, as set forth in their preliminary speeches, are carried out. This is as it should be since considerable new legislation will be required to set up the framework for the postwar economy.

It should be borne in mind that when the National Resources Planning Board or the National Planning Association issue a report or publish a pamphlet, they do not necessarily acknowledge their approval of the material or recommendations contained. Rather, they issue them to call attention to some of the thinking that concerns postwar economic policies. Nevertheless, the contentions that have been advanced have assumed a rather definite pattern.

A SPECIAL REPORT TO INDUSTRY

POSTWAR PLANNING

This is the third of a series of a detailed study of what is being thought about and accomplished toward making the postwar world a place in which the individual and industry may flourish.

Primary objective on which all concerned agree is that the end of the war must be followed by a period of full employment and high productivity. It is estimated that some 55,000,000 jobs, at good pay, will have to be provided in the postwar period to take care of our returning soldiers and sailors and our war workers and all others. Another plank on which there is general agreement is that depressions can be prevented in the future and that inflationary booms can be eliminated.

"It may not altogether be wishful thinking to say that we know more about depressions now that we did twelve years ago," says a pamphlet issued by the National Planning Association. "There seems to be more common agreement among economists and others that it is possible to take positive steps to control the ravages of depression.

"The Great American Depression, most of us now will admit," the pamphlet goes on to say, "was neither the contrivance of economic royalists for their own betterment nor the diabolical invention of New Dealers bent upon destroying business confidence. The origins were deeply ingrained in our national economy."

This pamphlet, entitled "Guides for Postwar Planning", and available from the association at 25 cents per copy, is worthy of careful study. Analyzing our national economy, it questions the wisdom of putting our faith in "automatic" or "self-generating" forces as we have done in the past and then advances a line of reasoning with this conclusion:

"We can have full employment and high levels of national income if we consume all that we are capable of producing." It goes on further to declare: "Actually we don't have the manpower or machines to produce anything like what we could all use; our economy never has produced enough.

Two Programs Suggested

"If we are to have full employment in the postwar period," the pamphlet continues, "there must be no potentialities of unused savings, no lack of investment opportunities. Just as during the depression the sight of want in the midst of plenty excited the wrath of so many, so to others the drying up of investment opportunities when so much more is needed in capital equipment constitutes a paradox that must be broken."

It next discusses two means for supplying the "missing link" in the production, income, consumption and savings circle that must be considered in connection with postwar planning. The first of these proposals may be called a market guarantee program. The other may be called a government investment program. Both of these programs are based on the expectation that private enterprise is destined to play an important part—even a major part—in our total economy. Both seek means of stimulating the largest possible amount of activity by private enterprise.

The market guarantee program—which, incidentally, has encountered considerable opposition, as will be explained later on—would give direct assurance to private industry that it can sell all it can produce. Essence of the scheme is a government contract to purchase at a certain price all unmarketable commodities within a certain overall production limit. On the basis of such guarantee, industry need have no reluc-

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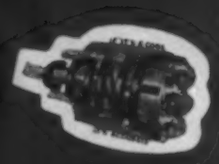


tance to utilize plant capacity to the full and to expand capacity in order to meet announced demand. Proponents of the market guarantee plan visualize the creation of a national board charged with responsibility for preparing a schedule for industrial expansion. The schedule would provide for a balanced expansion of industrial production in relation to employment, payrolls, required capital and consumer needs.

Minimum Annual Income for Labor

The board's first objective would be full employment, always bearing in mind the need for conserving the nation's resources, improving working conditions, preventing unwarranted price increases and maintaining a minimum annual income to labor. Production and expansion programs and employment quotas would be established for individual industries in co-operation with industry committees. Alongside the board would be a government corporation which would draw up the contract to buy surplus production; however, the proponents of this plan think that with full employment, high purchasing power and intelligently worked out production programs, the unsold surpluses should not be large. There also would be a government financial agency to supply money for plant facilities.

The other plan calls for direct government investment. Those subscribing to this school of thought are of the opinion that a government market guarantee plan would be too cumbersome and costly and that it would have a bad effect on the competitive forces that we have had in our economy. They fear that a serious chain of consequences affecting marketing practices, advertising, newspaper and magazine publishing, and industrial research might result. They argue that it is possible to achieve the same ends by a different procedure. They believe that if our government were to undertake large-scale investment in certain strategic areas of the economy, the net stimulative effect would be to provide a demand—a market—for consumer and other goods that would result in the full utilization of private industrial plants.

Government investment, according to advocates of this plan, would have the effect of insuring that our economy constantly would consume all that it would be capable of producing. This governmental investment would not fluctuate with conceptions of potential profitable activity, but would be programmed to keep our economy operating fully. Furthermore, the government, by confining its primary economic activity to certain strategic areas, would be able to assure private enterprise of a profitable and important place in the economy. Business confidence would not be impaired by such a program, so this group holds, since the strategic areas chosen would be ones where government participation in economic affairs already has had a long and growing record.

The first great strategic field for large-scale government investment is in urban redevelopment. Conditions such as slums, blighted and decaying areas, narrow streets, traffic congestion, crowded and tedious public transportation, inadequate parking facilities, meager recreational opportunities, all are cited as evidence that such redevelopment is needed on a large scale. Whole areas—not single tracts of land or even single blocks—must be bought and systematically replanned. The group that backs the government investment plan conceives this task as being so large that there is no visible end to the work which should be done in urban redevelopment.

This group sees in integration and modernization of transportation the second great field for public investment. Pointing out that we spend some twenty billions a year for transportation, proponents of the government investment program allude to our present transportation situation as chaotic. We have over-built facilities in some places and in some respects, leaving wholly inadequate facilities elsewhere. We have considerable competitive duplication, resulting in uneconomical use in some areas. We have high charges, coupled in many places with unsatisfactory service. This group sees the rebuilding of transportation, not only urban but throughout the country as a whole, as an almost unlimited reservoir of work to meet crying public needs.

River Developments Offer Opportunities

The third great field for government investment as seen by this group is in multiple-purpose river developments. The Tennessee Valley Authority is pointed to as having demonstrated the possibilities. The program involves construction of dams to regularize river flow both for navigation and flood control. Stored waters may be used for irrigation; also as reservoirs or lakes which will provide recreational facilities. Finally, this group points out, the dams will make possible generation of hydroelectric power, a development that will increase vastly our ability to produce.

The pamphlet expounds the theory that for full employment the national

Portraits of a few of the prominent participants in postwar planning are presented on this and following pages. For others, and the names of personnel of leading groups engaged in this work, see STEEL, *Jan. 25 and Feb. 1*

CHARLES F. KETTERING
Vice president, General Motors Corp., and trustee, Committee for Economic Development

RALPH BUDD
President, Chicago, Burlington & Quincy railroad, and chairman of a regional development division, CED

ERIC A. JOHNSON
President, Chamber of Commerce of the United States, and trustee, Committee for Economic Development

L. K. GARRISON
Dean of Law School, University of Wisconsin and member of the Research Advisory Board, CED

CHARLES W. TAUSSIG
President, American Molasses Co., and trustee, National Planning Association

JAMES G. PATTON
President, National Farmers Union, and trustee, National Planning Association

M. B. FOLSOM
Treasurer, Eastman Kodak Co., and trustee, Committee for Economic Development

WALTER D. FULLER
President, Curtis Publishing Co., and regional Chairman, Committee for Economic Planning

income will have to be somewhere in the neighborhood of 105 to 110 billions of dollars, at price levels prevailing in 1940. Figuring on the basis of expenditures in 1936, it presents the estimate that at this annual income sale of foodstuffs would increase from 16 to 25 billions; that annual outlay for housing would rise from 9 to 16 billions; that expenditures for household operations would rise from 5 to nearly 10 billions; that clothing expenditures would rise to approximately that same degree; and that expenditures for household equipment and furnishings would rise from 1.5 to 3 billions. It also is estimated that automobile sales would go from 4 to 8 billions and that our bill for recreation would jump from 1.6 to 3 billions.

Surely, this general plan of government investment is one calculated to arouse the interest of every man of business since it is based on a foundation of true competition. Customers would be free to pick out the products they wanted to buy, hence we would have a revival of our time-honored methods of competitive selling.

Question Planner on Human Nature

One of the planners at Washington recently was asked whether he thought that absolutely full employment and human nature could get along together over the long pull. He was reminded how at the present time of full employment workers in many instances are choosy about what they are willing to do, how housemaids quit their former employers for work at high wages in war plants, how sales people often are less patient and more independent, and how house repairs—when they can be done at all—in many instances are done with a patronizing attitude. He was asked whether he thought there would be a lot of this in the postwar period of full employment that is visualized under this plan.

"A lot of that sort of thing can be eliminated through education," this man replied.

The proposed government investment program would require the use of a lot of money. A natural question is: "Where is it all going to come from?" Suffice it to say at this point in the story that a lot of thinking has been done on this phase of the matter, and that the planners are convinced that there will be no difficulty in financing the program. How they think it can be done will be discussed in this department in next week's issue.

$56,000,000,000 Held "Bedrock" Figure for Civilian Economy

APPROXIMATELY $56,000,000,000 of goods and services (in 1941 dollars) would be required annually to maintain this country's civilian economy on a minimum or bedrock basis, Joseph L. Weiner, director, WPB Office of Civilian Supply, advised James F. Byrnes, director, Office of Economic Stabilization.

The $56,000,000,000 bedrock figure is some 32 per cent less than the value of the goods and services used for these same purposes in 1941. However, the reduction in physical volume is not as great as indicated, since the bedrock requirements are based on a good deal of substitution and simplification, representing a lower unit cost.

Mr. Byrnes had asked that the OCS undertake a study to determine bedrock civilian needs consistent with the fullest war production. While explaining that it was not his intention to try to reduce civilians to a bedrock minimum, Mr. Byrnes said that such a study would be of value in planning such matters as rationing, subsidies, the extent to which simplification and standardization can be pushed, and manpower.

"We do not expect the volume of civilian consumption as a whole to fall to bedrock levels this year," Mr. Weiner said today in explaining the report, "although in a number of important consumer fields, such as metals and rubber, it is already at or near bedrock levels. In a number of other fields these levels will undoubtedly be reached by the end of 1943.

"On the basis of present programs, we estimate that the bedrock requirements of civilians are 23 per cent less than the volume of goods and services they will actually receive in 1943. In other words, civilians could get along with 23 per cent less.

"This is explained partly by the fact that in 1943 existing inventories will make available certain consumer goods not essential in a bedrock economy, partly by the fact that in general this year's civilian goods will represent a higher per unit cost than simplified goods, and partly by the fact that the current production of some items is in excess of military and essential civilian needs. Failure to take advantage of such productive capacity would not only be pointless but would even prove harmful, since it might entail unnecessary unemployment and lowering of morale.

Regional and District Offices Will Aid Distressed Companies

TWELVE regional offices, headed by deputy regional directors, and 131 district offices, empowered to take action on the spot, have been established under the new decentralization plan of the Smaller War Plants Division of WPB, Lou E. Holland, deputy chairman, announced last week.

This plan which goes into effect immediately, Mr. Holland said, enables SWPD representatives to work directly with distressed plants and district procurement officers of the Army and Navy and other procurement agencies. Thus, problems of small business will be met at the source, contracts will be handled directly and distribution of war work among such distressed plants speeded up.

Mr. Holland called for the operators of distressed plants to supply immediately simple information regarding their organizations and urged them to mail the answers to ten questions to their nearest WPB office.

"If your plant needs business," Mr. Holland said, "answer the following questions, regardless of any other forms you already may have filled out:"

Firm name and full address.

Kind of business and products normally produced.

Kind of war work you are equipped to handle.

Average number of employes a year ago and now.

Dollar value of factory sales in 1941.

Dollar value of factory sales, by months, for the past six months.

Dollar value of business of all kinds on hand now.

A general description of equipment.

Kind of war work on hand, if any, and how much.

If your labor force has been depleted, to what extent can it be replenished.

"Our plan is producing results," Mr. Holland stated. "Our men in contact with procurement offices are bringing in requisitions every day which involve large quantities of work suitable for placement with distressed plants (including woodworking — textile — sheetmetal and machine shop) and we would like to place these orders with firms which need the work most right now. But in a great many cases we have no means of knowing the degree of distress of the plants whose facilities we consider for the work.

"We do not want an overall report of plant equipment. We may have had this previously. But, since then many plants have received war work. Our records get out of date in a month. Conditions are changing every day.

"I want to emphasize that these replies should be mailed in to the nearest WPB office. Do not bring them in because that will only slow down our efforts."

Mr. Holland has appointed Charles H. McArthur, chief, Field Service Branch, to supervise the regional setup.

Deputy regional directors are:

Boston, Richard Cooke; New York, H. P. Ingels; Philadelphia, A. Whittemore; Atlanta, Ga., T. A. Falvey; Cleveland, D. P. Ford; Illinois, L. A. Miller; Kansas City, R. W. Webb; Dallas, Tex., J. B. Joyce; Denver, R. W. Gordon; San Francisco, O. L. Starr; Detroit, H. A. Weissbrodt; Minneapolis, R. C. Duncan.

Minerals Supply Programs To Be Co-ordinated in New WPB Division

PLANS to co-ordinate and correlate the programs of all government agencies for increasing the supply of essential minerals and metals were announced last week by WPB Chairman Donald M. Nelson. A Mineral Resources Co-ordinating Division has been established within WPB, and will be aided by a Mineral Resources Operating Committee and a Minerals and Metals Advisory Committee. Howard Young, St. Louis, president of the American Zinc, Lead & Smelting Co., was appointed by Ferdinand Eberstadt, program vice chairman of WPB, to be director of the new division and to act as chairman of the two committees.

"One of the problems to which the WPB has given major emphasis," Mr. Nelson said, "is that of assuring that sufficient supplies of minerals and metals are available for essential war production.

"Several governmental agencies have been working on various phases of this problem and the responsibility has been divided among them. In order to achieve the maximum benefit it has been decided that the efforts of these groups should be concentrated.

"As the result of conferences with 11 agencies a plan has been devised to effect this. By establishing the Mineral Resources Co-ordination Division, under the direction of Mr. Young, we have made it possible to fuse the best of each group's programs into a single plan."

To aid Mr. Young in reaching decisions concerning the development of resources two new groups have been established. The Minerals and Metals Advisory Committee comprises representatives of all the major governmental agencies concerned with the production of ore. These include: War Department, Navy Department, Board of Economic Warfare, Reconstruction Finance Corp., Bureau of Mines, Geological Survey, Bureau of Foreign and Domestic Commerce, WPB Office of Civilian Supply, WPB Office of Production Research and Development, WPB Facilities Bureau, WPB Labor Production Division, and WPB Stockpiling and Transportation Division.

Representatives Will Be Named

The Mineral Resources Operating Committee will be composed of a representative to be named by the Secretary of the Interior and representatives of the Board of Economic Warfare, the Reconstruction Finance Corp. and the Office of Production Research and Development, WPB, in addition to Chairman Young.

"At meetings of the two committees, all proposals and programs can be thoroughly discussed. The broad, general picture of such plans will be presented by the advisory committee and more specific working programs will be considered by the operating committee.

"In this way proposals for investigating and exploring ore bodies and for testing, developing and utilizing new processes for production of minerals and metals will represent the combined efforts of all groups to increase raw material supply."

"Only those proposals and programs reviewed and recommended by the operating committee will be considered for final approval.

Under the new arrangement, the Mineral Resources Co-ordinating Division will be responsible for co-ordinating plans, programs and procedures within WPB and with the other governmental agencies. It also will assemble recommendations for increasing the minerals supply. It will advise the program vice chairman in these respects.

Efficient Functioning of Plan To Depend on Intelligent Cooperation

CMP still is in the tuning-up stage. A number of adjustments have been made since the plan originally was announced, and other revisions will follow as the need dictates. Additional regulations giving detailed instructions and legal standing to various operating phases are practically complete and due to be issued soon.

CMP probably will not be a smooth-working machine when it gets under way April 1; time will be required to iron out the "bugs" and to bridge the transition from PRP. How quickly the plan starts to function efficiently as intended will depend in large measure on the intelligent co-operation of the companies operating under it.

Allotment Applications

Feb. 9 is the deadline for filing applications on CMP-4A or CMP-4B for allotments of controlled materials. In most cases manufacturers of "A" products submit their applications to their customers —usually the Claimant Agency responsible for the purchase or supervision of production of the products. Makers of "B" products generally apply to the appropriate WPB division.

There are some exceptions to the above rules. Prime manufacturers of "A" products which have not had dealings with a Claimant Agency should file CMP-4A with WPB in Washington. Subcontractors of "A" products, however, file with the contractor buying their products. Class A products sold as repair parts require a CMP-4B application by their manufacturer, filed with WPB, although this should not cover spare and repair parts bought directly by a Claimant Agency.

CMP-4C is the form used on construction projects. Prime contractors file with the appropriate Claimant Agency, or, if the work covered is a private project in which a Claimant Agency is not involved, the form should go to WPB. Subcontractors on construction submit the same form to the general contractor if work is done on the site, or file 4A with him if the only relationship to the project is sale of an "A" product incorporated in the structure.

Changeover From PRP

Timetable of CMP calls for prime consumers to receive their second quarter allotments of controlled materials by March 1. Those late in filing their applications will be slow to receive their allotments. The delay won't be fatal, because first quarter PRP authorizations are automatically extended into the second period with the following restrictions:

First quarter PRP ratings may be applied in April to 40 per cent of the production material (no maintenance, repair or operating supplies) authorized on PD-25A for the first quarter; for April and May ratings may be applied to 70 per cent. First quarter PD-25F authorizations issued before March 1, 1943, also may be included. Duplications of PRP and CMP authorizations must be eliminated when allotments are received.

If the CMP allotment is not received by March 31 the balance of the PRP authorization will be released for June. These percentages may be adjusted by WPB in individual cases if circumstances warrant.

See the latest amendment to Priorities Regulation No. 11 (Production Requirements Plan) and Priorities Regulation No. 11A for detailed instructions covering the switch from PRP to CMP.

CMP SUGGESTIONS

Study all CMP Regulations carefully.

Be sure all requirements of subcontractors are covered when allotment applications ar filed.

Don't allot more controlled materials than amount authorized.

Don't combine allotment procedures for the same product.

Keep adequate records of allotments. WPB will issue a guide for suggested accounting and bookkeeping methods.

Don't wait for CMP allotment before placing orders for controlled materials. See Schedule III of Regulation 1.

Start to adjust inventories to conform to 60-day supply or minimum practicable working stock by April 1.

Be guided by Priorities Regulations No. 11A and No. 11 as amended in changeover from PRP to CMP.

Inventories

CMP Regulation 2 specifies that April 1 inventories of steel, copper and aluminum must be either a 60-day supply or a minimum practicable working inventory, whichever is lower. Exceptions will be permitted if the Claimant Agency or Industry Division can be convinced a larger stock is necessary or customary.

Other causes for exception:

1. Material received prior to the delivery date specified by the consumer on authorized orders.

2. Material shipped or loaded for shipment before supplier received notification of reduction, postponement or cancellation of the order.

3. Deferred delivery requestetd but material is of a special nature not readily disposed of by producer elsewhere but can be used at future date by the buyer.

4. Conflict between inventory limitations and minimum quantities indicated in Schedule A of Regulation 2.

Form CMP-7, listing controlled material inventories, must be filed with WPB by Feb. 22.

Existing priority regulations continue to control stocks of material other than steel, copper and aluminum.

Distributing Allotments

Allotments of controlled materials by prime consumers may be made vertically or simultaneously. WPB recommends the latter plan in which allotments are passed simultaneously to all secondary consumers and not merely to the next immediate subcontractor. The vertical method, more time consuming, passes allotments successively through each subordinatae supplier until each subcontractor has taken out his share of material. One or the other method must be used for an individual manufactured product; they may not be combined.

WPB is preparing special accounting manuals giving simple debit and credit methods for keeping records of allotments and their use. These will assist manufacturers to set up their bookkeeping procedures under CMP.

Placing Orders

Ordering controlled materials should not be deferred until allotments have been received. Schedule III of CMP Regulation 1 shows when delivery orders should be placed, measured by the number of days in advance of the first day of the month in which shipment is required. For alloy steel this ranges up to 75 to 105 days. Such delivery orders may be converted into authorized material orders on receipt of allotments. For method of conversion see paragraph (a) (6) of Regulation 1.

MRO Supplies

A simplified method of obtaining maintenance, repair and operating supplies will replace existing practice for most companies. This is described in CMP Regulation 5 which will be issued shortly. The plan proposes to divide industries into three groups, rated according to their essentiality. Each industry will be given an identification number.

Nonessential industries will be unable

(*Please turn to Page* 140)

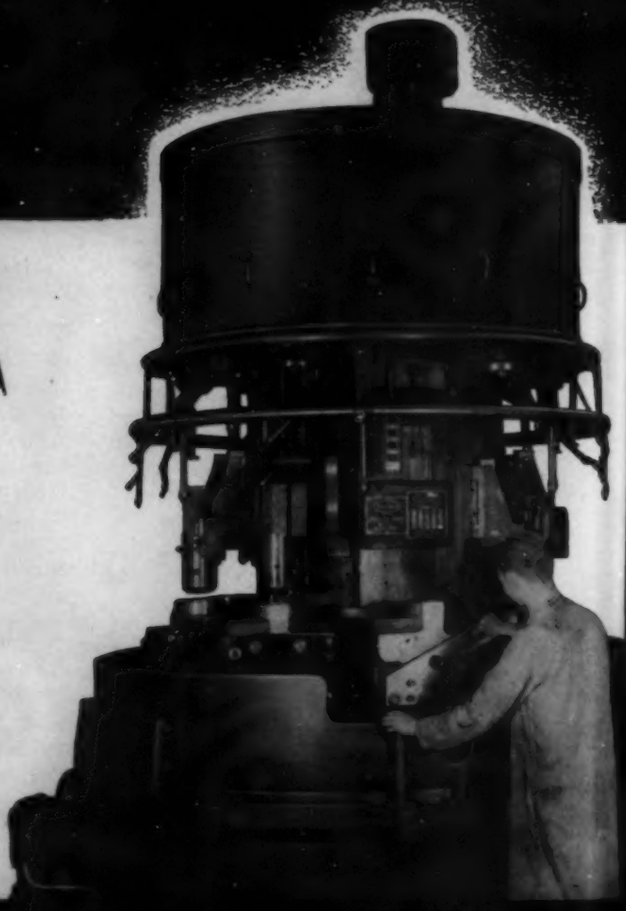
Bullard Employees are proud to be able to fly the "E" pennant for high production.

THE

To win this war every bit of raw material must be used, every kilowatt of power, every foot of production floor space, every minute of every day, every bit of strength of every citizen.

To do our present best is not enough if by new means, new methods, our best can be more effective. Here is an example of what we mean. Recently three Bullard Mult-Au-Matics replaced 18 other machines on a certain job in an aeroplane engine plant. The change saved 15 machines, a great deal of money, and most important of all, released 8 men per shift for other sorely needed work.

Bullard Mult-Au-Matics and Bullard V.T.L.s have the power to produce, the power to make your best even better.



THE BULLARD COMPANY

BRIDGEPORT, CONNECTICUT

By A. H. ALLEN Detroit Editor, STEEL

MIRRORS of MOTORDOM

Investigations paint rosy picture of postwar automobile market. . . Plenty of buyers well armed with cash. . . Controls likely to prevent runaway production. . . Rainbow's end for labor

DETROIT

SOME CONCENTRATED thinking is being applied to the shape and size of the postwar market for consumer goods —principally automobiles—in this country and in the entire world, for that matter. It should be emphasized that so far this activity has not proceeded much beyond the stage of surveys, research and reasoning; and most of the results are off the record.

Investigational work is being pushed not only by the individual motor companies, but by civic organizations as well. The Detroit Board of Commerce, for example, has already circularized its members with a summary of some of the thinking of its research staff on the postwar world, emphasizing some of the problems which it sees ahead for Detroit and asking for criticism and recommendations.

One of the principal points for consideration is the effect which numerous and widely scattered government-financed plants may have on the decentralization of the motor industry away from Detroit. Other significant points examined include Detroit's position in the aircraft industry; possibilities for greatly expanded export markets (Detroit industry exported about 15 per cent of its output in normal times), and the development of urban and interurban transportation systems, notoriously weak factors in Detroit's growth.

Experts Study Postwar Auto Market

One of the leading motor companies has put a group of research and marketing experts to work on sizing up the postwar automobile market, and has developed basic data which it may be pertinent to review here. While the source must remain anonymous, the figures cited are backed by careful investigational studies.

First, to get a line on cash available for spending in consumer markets, the estimated national income for 1943 and 1944 is broken down to show its disposition. The 113-billion dollar figure for this year divides into 78 billions for consumer goods and services, 26 billions for taxes and savings, leaving 9 billions of "orphan" dollars. The 1944 estimate of 130 billions national income breaks down into 55 billions for consumer goods and services, 50 billions for taxes and savings, leaving 25 billion "orphan" dollars.

If this leaves any doubt about the availability of spending money, turn to an analysis of the backlog of demand for automobiles being built up during the present period of suspended manufacture. Assuming there had been no interruption to car manufacture, in 1945 total registrations of passenger cars would approximate 32,600,000, of which 23,800,000 would then be 1-8 years old and 8,800,000 would be over 8 years old. However, with no new cars produced since February, 1942, by 1945 there will be 11,000,000 cars 1-8 years old, and 10,400,000 over 8 years old. This leaves a theoretical backlog of 11,200,000 cars which the public will need by 1945 or roughly two full years of peak production.

To shed further rosy illumination on the postwar picture, compare certain basic economic factors of the country during the last war, or in 1917, with their counterparts 25 years later or at the end of 1942:

	Last war	This war
Population, millions	103	135
Immigration	5,000,000	373,000
National income, billions	63	120
Wholesale price index	150	96
Cost of living index	130	112
Bond yields	5%	2%
Labor supply index	74	100
Labor/machine efficiency	93	148
Industrial production index	73	186
Food production index	105	152
Hours worked weekly	50	42
Birth rate index	25	18
Death rate index	14	11

There is no need to analyze these figures in detail. Suffice to say they strengthen the indication that the postwar market will absorb all the production that can be achieved, but this brings up a corollary question as to whether it will be sound policy to try to stretch production to encompass this travel-hungry and goods-hungry market. It is true the temptation will be strong to rush back into peace-time production and to get the jump on the competition, but an immediate glutting of the market for consumer goods might only be borrowing trouble a few years later. The more prudent policy might be to "meter" or ration production to spread the demand out over a greater period of time.

Under free competition it is difficult to see how any voluntary control of automobile production could be worked out to accomplish this temperate fulfilling of post-war demands. The obvious alternative is government control, both of production and consumer purchases, with all its attendant unfairness, special privileges and political shenanigans. There is this consolation: The bureaucracy of the Rooseveltian years may well be abdicating in favor of a practical and realistic system of control guided by men experienced in the field of business and acquainted also with the intricacies of federal government. Men of this caliber are already in the government service and are tempering much of the former New Deal type of thinking.

In considering the postwar period, it is becoming clearer that we must be a little more specific as to which war is meant—since the United Nations are fighting two wars, the German and the Japanese. Trend of thinking is in the direction of an early finish to the German war but a continuance of the Pacific war beyond this time. It is entirely possible that once the European and African war is terminated, there will be no need for the tremendous productive capacity now established for armaments and a relaxation on restrictions against production of consumer goods will be feasible.

This might even mean the return of automobile production before the conclusion of the Japanese war which some observers see as primarily a naval and air conquest and capable of being amply supplied with a fraction of the country's productive capacity. One suggestion, with more than a little logic in it, runs to the effect that the best way to handle the Japanese situation is simply to arm the Chinese to the teeth with American weapons and let them take care of annihilating the Jap militarists. Doubtless the Chinese would welcome the opportunity to do just this, and the plan might ease many foreseeable racial problems involved in subjugating the Japs.

Radical Designs Not Expected

One thing certain is that the immediate postwar automobiles will be counterparts of the 1942 models. Another fairly sure bet is that any radical innovation in passenger car design and construction will be several years in coming, and will depend in large measure on just how far the major producers—that is, the big three —are willing to go. The smaller companies cannot afford to risk going against the trends established by their big brothers, and the latter in turn can ill afford to take any gambles on untried designs where production schedules run into the millions.

Three important factors seen affecting the eventual postwar car are: Speed restrictions, material costs and the extent of monetary inflation. If a national speed limit on highways of, say, 45 miles an hour is established, then the day of

the high-power automobile engine is done, and engineers can move toward lopping off 500-1000 pounds from the weight of the average car. If the cost of aluminum and magnesium are pushed down to the present level of iron and steel, then they will prove attractive alternate materials, but obviously the iron and steel people are not going to stand idly by and see this happen.

In any event, keep your tongue in your cheek when you look at these fanciful sketches of the "car of the future" emanating from the pens of many industrial designers. You will have to engineer and build an automobile within certain definite cost and time limits after its outlines appear on paper.

One of the tougher nuts to crack in connection with postwar problems is the matter of tires. In a couple of years it is estimated there will be 20,000,000 cars requiring four new tires each and some spares besides. Assuming that, by this time, production of new cars will have been resumed and annual output is geared to the 3,000,000-car level, there's another 15,000,000 tires for original equipment. Put them all together and you have a neat 100,000,000 rubber tires which somebody is going to have to make—if the rubber is available. Now, the best year the rubber companies ever had saw production of only about 45,000,000 passenger car tires, so even granting the possibility of installation of new tiremaking machinery on a broad scale, there is a real job ahead to meet this onrushing demand.

Crippled Lad Earns $75 Weekly

A single case history seldom proves a point, but here is one which is so typical of what has happened around Detroit in the past 18 months that it is worth of inclusion in the record. A young crippled lad whose only means of livelihood was shining shoes and sweeping the floor in a small barbershop, bringing him possibly $10 or $15 a week, decided to get himself a war job. He had no mechanical experience or training, but finally landed a job with a local machinery builder loaded down with war contracts. He was started as a learner on a production machine at 75 cents an hour, and worked about 48 hours a week, netting about $40 weekly. In a few weeks he was advanced to 90 cents an hour and his earnings rose to nearly $50 a week. Recently he told friends that he is now transferred to bench work at $1.40 an hour, burring screw holes. Naturally he is overjoyed at now being able to collect about $75 a week, but is a little disturbed over the production situation in his plant. He says he could easily burr 200 holes an hour and not even exert himself; but "the unions" hold him down to 40 holes an hour—no more—so that's what he has to turn out.

Now there would be no difficulty at all in finding dozens of cases exactly like this. Women workers particularly have railed at either inferred or enforced restraints on production, but beyond talking anonymously to reporters they are powerless to do much about it. Union leaders must know the situation; either they condone it or they wink at it. The only sane answer is a return to a sound and fair piecework system, but there is about as much chance of this as of Eddie Rickenbacker being elected president of the UAW-CIO.

There will be no solution to pressing manpower problems until there is some realistic approach to making more efficient use of manpower now on the job.

Bearing on this entire situation is the offer of a coal company here made in a newspaper advertisement seeking truck drivers. Wages: As high as $165 a WEEK!

GMC May Acquire New Company

General Motors Corp. and Yellow Truck & Coach Mfg. Co. have announced that an offer had been made by the former to acquire all assets of Yellow Truck. The offer proposes that assets of Yellow Truck shall be acquired in exchange for common stock of General Motors, which in turn will be distributed by Yellow Truck to its stockholders in exchange for their stock in that company.

According to the offer, a holder of one share of 7% cumulative preferred stock of Yellow Truck will be entitled to receive 2.7 shares of the common stock of General Motors and a holder of three shares of the class B or common stock of Yellow Truck will be entitled to receive one share of common stock of General Motors.

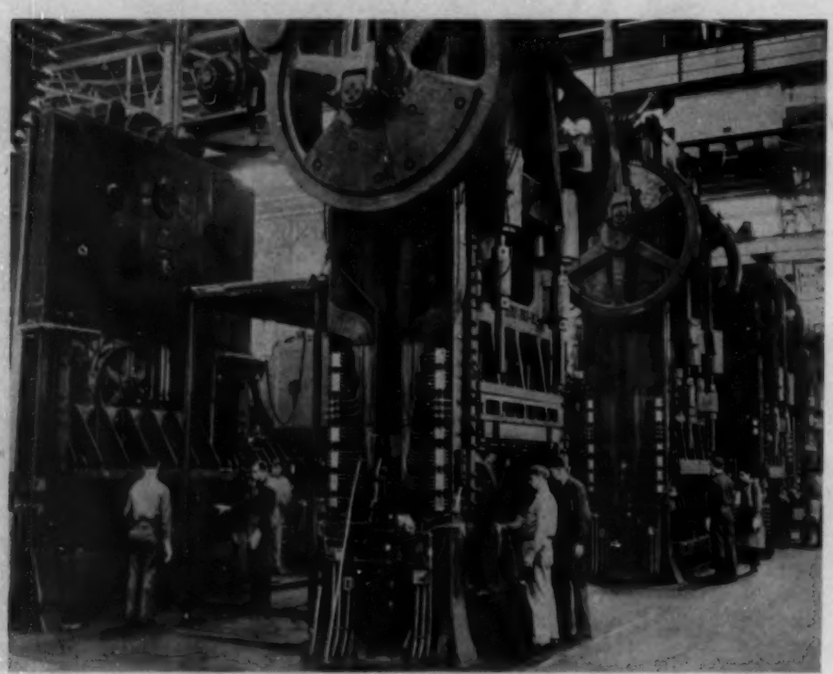
General Motors owns 103,450 shares, or 71.9 per cent, of the 7% cumulative preferred stock of Yellow Truck, 715,260 shares, or 32.5 per cent, of the class B stock, and 800,000 shares, or 100 per cent, of the common stock.

Acquisition of the assets of Yellow Truck by General Motors will result in a direct participation by GM in the motor coach and medium and heavy-duty truck manufacturing fields, in which the latter is not now represented.

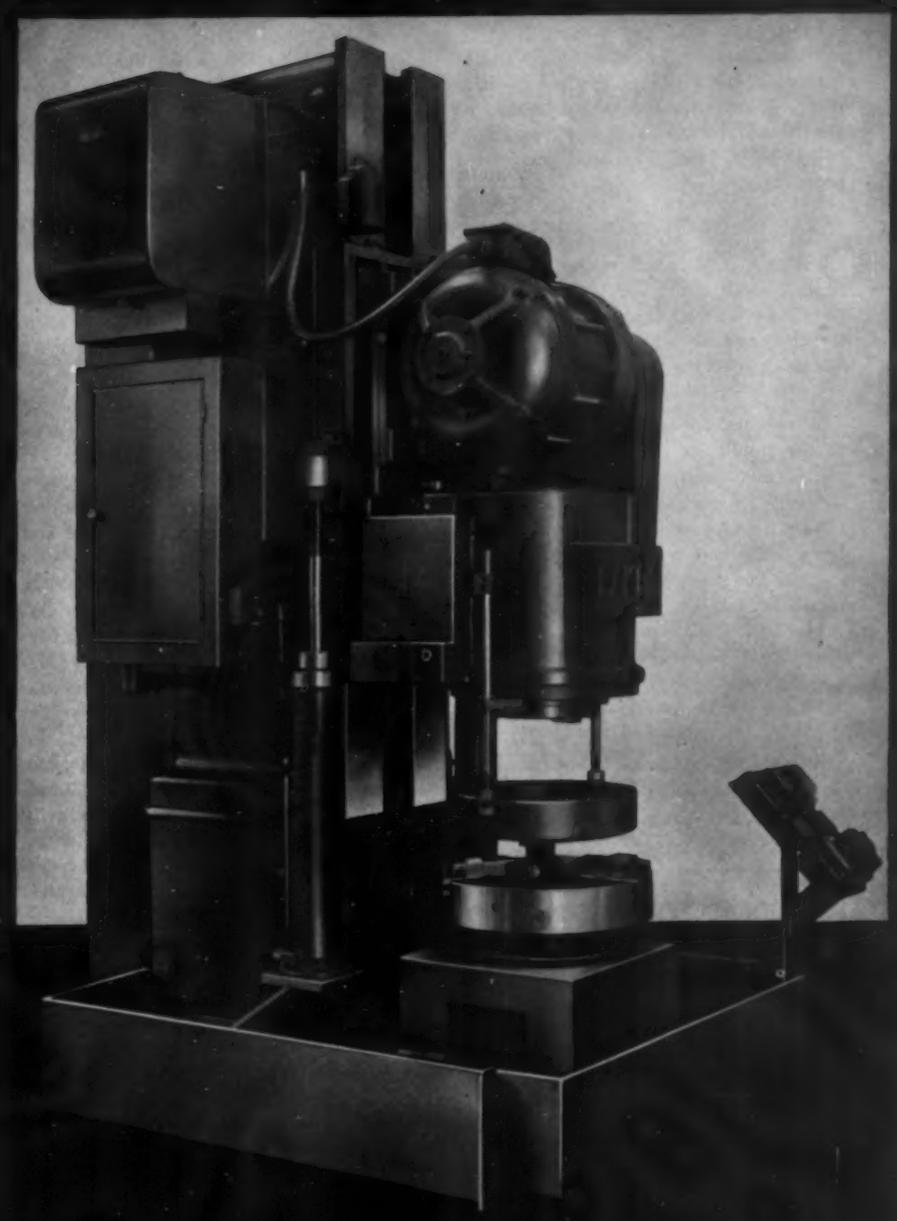
—o—

Thirty-four employes of Westinghouse Electric & Mfg. Co., at East Pittsburgh, Pa., one of them a woman, were recently awarded a total of $6174 for ideas which increased production of war equipment and saved vital materials during 1942.

AUTOMOBILE PRESSES PRODUCING TANK AND BOMBER PARTS



HERE are a few sheet metal presses in the automobile industry which have not been turned out into the cold for the duration. They are in the Desoto press plant in Detroit, one of the most modern press shops of its type in the country, and now are turning out parts for tanks, bombers and army trucks. Note the 46 centralized lubrication stations on the side of the press in the foreground



BAKER

60-HO-4

EXTRA HEAVY DUTY SINGLE SPINDLE HYDRAULIC FEED DRILLING AND BORING MACHINE SET-UP FOR PRODUCING AIRCRAFT CYLINDER SLEEVES

This versatile **BAKER MACHINE** is illustrated as set-up for rough boring Aircraft Cylinder Sleeves on a high production basis, a job in which its features stand out to advantage. The 3-jaw chuck is operated by a torque motor; the material bored is an alloy steel forging. Features of the Machine include a powerful drive to the spindle by enveloping cone-type worm and worm gear—the spindle is of an extra large diameter with 12½" diameter flanged end for directly attaching cutter heads — four quick-changes of spindle speeds by means of two-speed motor, plus provision for pick off gears, provide extreme spindle speed flexibility — vertical frame is extra-ribbed. Complete engineering data on this Machine's success in various heavy duty drilling, boring and facing operations will be sent upon request.

Baker Brothers, Inc.

Single and Multiple Spindle Machines for DRILLING • BORING • FACING • TAPPING

Toledo, Ohio

White Motor Sales Force Now Service Organization

An intensive program of preventive maintenance and parts conservation to keep motor trucks hauling war goods has been planned by White Motor Co., Cleveland. Its entire sales force has been turned into a service organization. Preventive maintenance calls for systematic check-ups, taking into account the life and maintenance requirements of all working parts. Under the parts conservation plan, parts are rebuilt wherever possible; in case of replacements, old parts must be turned in.

—o—

Arthur J. O'Leary & Son Co., Chicago, has changed its corporate name to Kelly-O'Leary Steel Works.

—o—

Zell Corp., Baltimore, manufacturer of electrical parts for aircraft, has moved from 415-417 East Oliver street, to larger quarters at 1300-1304 Lovegrove alley.

—o—

Oil City Tank & Boiler Co., Oil City, Pa., has changed its name to Electroweld Steel Corp. There have been no changes in management or directors. Entire manufacturing facilities of the organization are now devoted to production of electroweld tubing, and new mill, now being built, will increase electroweld production.

—o—

Carhoff Co., 3050 Kensington road, Cleveland, maker of welder's-pal eye drops, used for relief of eye burns caused by welding flashes, has appointed Boyer-Campbell Co., 6450 Antoin.. street, Detroit, a distributor.

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Aluminum Co. of America has given to the public its patent rights covering use of motor armor rods. This makes it available to all without licensing procedure. Armor rods resemble an extra layer of heavy strands covering the cable at points of support. They were invented originally for the purpose of protecting cables from fatigue produced by resonant vibration. Considerable time and material may be saved in the rehabilitation of old lines by the use of armor rods.

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Bicycle tail-lights are being placed on parachutes, according to engineers at the Westinghouse Lamp Division, Bloomfield, N. J. The tail-lights formerly made for bicycles have proved to be adaptable for this purpose. A lamp and small dry cell fastened to each cargo parachute makes it easier for paratroops to locate supplies dropped to them at night. The same lamp and battery combination fastened to a life preserver aids a struggling swimmer to see it in the dark. The tail-light is one of more than 200 peacetime lamps that have been pressed into military service.

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Wilson-Brown Co., New York, will hereafter be known as the Harrington-Wilson-Brown Co. Dan Harrington has become a general partner holding the controlling interest. There will be no change in management or personnel and the company will continue to represent the following machine tool firms: Carlton Machine Tool Co., Cincinnati Shaper Co., Barnes Drill Co., Giddings & Lewis Machine Tool Co., Lodge & Shipley Machine Tool Co., and Kempsmith Machine Co.

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Kaiser Co. Inc., iron and steel division, closed its Cleveland office in the Standard building, Jan. 30. District activity will be handled by its Pittsburgh office. A. C. Ruddell, Cleveland district manager, will return to the company's main office in Fontana, Calif.

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Omega Research Laboratory, P. O. Box 25, College Park station, Detroit, has been organized to furnish consultant service on magnetic inspection problems, including planning and installation of magnetic inspection departments; and to carry out commercial magnetic inspection work. James P. O'Donnell is president.

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Purchasing and accounting departments of Cincinnati Shaper Co., Hopple, Garrard and Elam streets, Cincinnati, have been moved to the Bond Hill plant at 4700 Paddock road.

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Sowers Mfg. Co., Buffalo, manufacturer of seamless jacketed kettles and other heating, cooling and mixing equipment, has been acquired by a group of capitalists from Chicago, headed by D. M. Hokin, president, Century Steel Co. Property includes a modern factory of approximately 100,000 square feet floor area. Mr. Sowers is retiring because of poor health. The new owners have elected E. W. Fielder, Century Steel Co., as president.

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Plans to re-open the former W. H. Davey sheet mill in Cleveland have not developed and the property is being offered for sale through the Steel Mill Liquidating Co., New York.

BRINGS CAR OWNERS AND RIDERS TOGETHER

RIDE bureau at Federal Shipbuilding & Dry Dock Co., Kearny, N. J., has increased to 3.2 persons per car the number of employes carried to and from work by private automobiles through its campaign to relieve traffic tie-ups and conserve rubber and gasoline. Share-the-Ride drive is bringing together "I want riders" and "I want to ride" employes on the basis of a voluminous index sorted as to shifts, cities, counties and localities as far away as Connecticut. A map and instruction folder distributed by the bureau points out all types of transportation routes to and from the yard, including new services by trolley lines

Development Speeded by War Need Now Produced by Major Companies

PITTSBURGH

COMPLETELY shrouded in a cloud of censorship, development and use of boron-containing steels is rapidly approaching a maturity reached without benefit of infancy because of war pressure.

Speedup given to this strategic development in ferrous metallurgy may, when the complete story is told, have no equal in the history of steelmaking. In the short space of two years it has jumped from an unknown laboratory development to a major factor in steel production. The impetus, of course, was supplied by scarcity of suitable alloying elements, and every green light was turned on in an effort pointed toward development of boron as the cure-all for the shortage.

It is not the cure-all, nor does it approach the goal of an omnipotent metallurgical philosopher's stone. What it does, however, is important and practical enough so that all major steel companies are now producing boron-containing steels, or preparing to produce them, in commercial quantities.

All the questions have not yet been answered. Time and unceasing efforts in both the laboratory and the shop are the only agents which can produce all the answers, but enough of the answers are already known to indicate the importance of this new development both to the war effort and to industry after the war. Basically, the addition of boron containing material, usually in the form of ferroalloys, to steel affects the hardenability of the finished product.

Increased hardenability has been reported in virtually every type of steel thus treated, from carbon through almost the entire alloy range, and including especially the new NE alloys.

Much work remains to be done on every aspect of this problem. Methods of addition, determination of the residual boron in the finished steel, percentage of boron required for attaining certain definite results, and other similar factors have not yet been frozen, but await the eventuation of many researches now being carried out. The form in which additions should be made is an item of controversy, with about half a dozen producers now offering ferroboron and boron compounds and mixtures in different forms and analyses.

Rigid and necessary censorship has hampered public discussions of these problems, but the undercover development has been rapid, and almost every week brings new answers to some of them. The volume of steel so treated has jumped from a negligible quantity to sizable tonnages in the past year, and will multiply rapidly in the months to come, and with the widespread use of this steel will probably come the upper and lower limits of the usefulness of boron as an alloying agent.

Electro Metallurgical Sales Co., Molybdenum Corp. of America, Ohio Ferroalloys Co., Titanium Alloy Mfg. Co. and Vanadium Corp. of America are reported among companies now offering ferroboron or similar products. Boron steels are made by most companies.

NEW FACILITIES

War Plant Additions, Equipment Purchases Authorized by DPC

Purchases of new equipment for and additions to government-financed war production plants authorized by the Defense Plant Corp. last week include (all facilities will be owned by DPC and operated by the contractors):

With International Resistance Co., Philadelphia, to provide plant facilities in Pennsylvania at a cost approximating $2,000,000.

With Timbeam Inc., Detroit, to provide plant facilities in Michigan.

With Tavares Construction Co. Inc., National City, Calif., to provide additional plant facilities in California at a cost of approximately $535,000, resulting in an overall commitment of approximately $2,800,000.

With Eaton Mfg. Co., Cleveland, to provide additional equipment for a plant in Ohio at a cost of approximately $190,000, resulting in an overall commitment of approximately $1,700,000.

With Luscombe Airplane Corp., West Trenton, N. J., to provide additional plant facilities in New Jersey, resulting in an overall commitment approximating $150,000.

With Square D Co., New York, to provide additional machinery and equipment for a plant in New York, resulting in an overall commitment of approximately $630,000.

With Nordberg Mfg. Co., Milwaukee, to provide additional equipment for a plant in Wisconsin resulting in an overall commitment of approximately $1,950,000.

With Air Reduction Sales Co., New York, to provide plant facilities in Texas at a cost of approximately $350,000.

With Lombard Iron Works Co., Augusta, Ga., to provide equipment in a plant in Georgia at a cost approximating $90,000.

With General Motors Corp., Detroit, to provide machinery and equipment for a plant in Michigan at a cost of approximately $12,000,000.

With Liberty Aircraft Products Corp., Long Island, N. Y., to provide additional facilities for a plant in New York at a cost of approximately $180,000, resulting in an overall commitment of approximately $2,170,000.

With Root Petroleum Co., Shreveport, La., to provide additional plant facilities in Arkansas at a cost of approximately $980,000, resulting in an overall commitment of approximately $4,480,000.

With Douglas Aircraft Co. Inc., Santa Monica, Calif., to provide additional facilities in California at a cost of approximately $1,565,000. This increase will result in an overall commitment of approximately $10,600,000.

With Tung-Sol Lamp Works Inc., Newark, N. J., to provide additional plant facilities in New Jersey at a cost of approximately $330,000. This increase will result in an overall commitment of approximately $700,000.

With Buffalo Arms Corp., Buffalo, for the expansion of a plant in New York at a cost of approximately $100,000, resulting in an overall commitment of approximately $14,000,000.

Buyer Warns Against Unnecessary Ordering

Estimating that 16 officers and employes of North American Car Corp., Chicago, take part in handling orders for materials or supplies from the requisition stage to purchase, W. K. Wilner, purchasing agent for the company, in a recent letter to division superintendents cautioned them to conserve time and effort of all concerned as follows: "When you order materials for your operations, think first if this item can be increased. Not increased beyond maintaining a workable inventory, but increased so as to avoid duplicating unnecessary requisitioning of the same item frequently".

MEN of INDUSTRY

LAWRENCE H. WILSON

A. R. MATHIESON

W. H. SICKINGER

S. H. HOBSON

Lawrence H. Wilson, for a number of years product designer and stylist for the Norge and Detroit Vapor Stove divisions of Borg-Warner Corp., and more recently consultant designer for various appliance manufacturers, is now associated with the staff of George W. Walker, Detroit, widely known automotive and industrial designer. Mr. Walker now spends considerable time in design activity for the Ordnance Department in Washington, dividing his time between that city and Detroit.

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A. R. Mathieson has been named salary administration supervisor, United States Steel Corp. of Delaware, Pittsburgh. Formerly assistant director of industrial relations, he will continue to serve as chairman of the pension committee and for the present will continue his activities in the administration of the corporation employes' group life insurance plan.

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DuRay Smith, general manager, Union Spring & Mfg. Co., New Kensington, Pa., has been appointed vice president in charge of operations of the entire spring plant and also the electric steel casting department.

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John M. Frank, president, Ilg Electric Ventilating Co., Chicago, has been elected president, National Association of Fan Manufacturers, Detroit.

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Robert A. Hurley, former governor of Connecticut, has been elected vice president and director, Narragansett Machine Co., Pawtucket, R. I.

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W. Gibson Carey, since 1932 president, Yale & Towne Mfg. Co., Stamford, Conn., has been elected a trustee, Consolidated Edison Co., New York.

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A. W. Herrington, chairman of the board, Marmon-Herrington Co. Inc., Indianapolis, has been elected a director, Army Ordnance Association.

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W. H. Sickinger has been appointed director of production, Fostoria Pressed Steel Corp., Fostoria, O. Heretofore Mr. Sickinger has been in charge of development of the company's line of commercial cooking equipment, now in demand by the armed services of the United Nations.

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S. H. Hobson, formerly executive vice president, has been elected president and a director, George D. Roper Corp., Rockford, Ill., succeeding the late Mabon P. Roper. All other officers have been re-elected, including **W. E. Derwent, E. Carl Sorby** and **J. P. Curtin** as vice presidents, and **Floyd K. Lawson,** secretary-treasurer. Manufacturing operations will be supervised by **Otto Olson,** works manager.

Shelby L. Large and **Hugo L. Olson,** of Rockford, and **Bert Pratt** and **J. Sanford Otis,** of Chicago, have been re-elected to the board of directors.

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H. S. Robertson, general sales manager, and **F. H. Atwood,** of the legal department, Harbison-Walker Refractories Co., Pittsburgh, have been elected to the board of directors.

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Ellsworth W. Allison has been appointed assistant secretary, Detroit Rex Products Co., Detroit. Prior to joining the company he was associated for six years with the law firm of Lucking, Van Auken & Sprague, Detroit.

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A. F. Murray has been appointed works manager, Old Greenwich, Conn., plant of Electrolux Corp. Associated with Westinghouse Electric & Mfg. Co. over 20 years, the past 14 years he has been a member of the company's headquarters manufacturing staff. He is a member, American Society of Mechanical Engineers, American Society of Tool Engineers and Army Ordnance Association.

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W. C. Henning was elected president and treasurer, A. Leschen & Sons Rope Co., St. Louis, at recent annual meeting. Other officers were: Vice president, **John A. Leschen;** vice president in charge of plant and production, **Arthur A. Leschen;** secretary, **James A. Burns.**

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William J. Thomas, manager of mechanical tube sales, Babcock & Wilcox Tube Co., Beaver Falls, Pa., has been appointed assistant general sales manager of the company. Mr. Thomas, formerly with the Process Equipment Division of the company at Barberton, O., was transferred to the executive department of the sales offices in 1941.

Leon E. Jeanneret, formerly assistant general sales manager, has been named manager of sales, Welded Tube Division, with offices and plant at Alliance, O.

Edward A. Livingstone, general sales manager at Beaver Falls, will also be general sales manager of the Welded Tube Division at Alliance.

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Roger C. Griffin has been elected vice president, Arthur D. Little Inc., Cambridge, Mass., industrial research organization. **Henry G. Powning** succeeds Mr. Griffin as treasurer. **Frank N. Houghton** has been named secretary and **Russell H. Stephens,** comptroller.

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Michael Hogan, Bierman Everett Foundry Co., Irvington, N. J., has recently been elected vice president, New Jersey Foundrymen's Association, to succeed **H. L. Edinger,** Barnett Foundry & Machine Co., Irvington. **Arthur M. Torrey,** secretary, Employers Association of New Jersey, also has been elected secretary of the Foundrymen's

association, in the continued absence of **John L. Carter,** who is on temporary leave with the Office of Price Administration, Washington.

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Robert S. Sloan has been named welding specialist for Westinghouse Electric & Mfg. Co. in the North Pacific area, comprising Washington, Oregon, northern Idaho and Montana. He formerly served as appliance supervisor at San Francisco and Los Angeles.

Henry D. Moreland, since 1938 X-ray division manager at Portland, Oreg., has been advanced to manager of the X-ray products, agency and specialties department of Westinghouse, with headquarters at East Pittsburgh, Pa.

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Louis F. Theurer, industrial sales manager, Milwaukee Paint Division, Pittsburgh Plate Glass Co., has been appointed West Coast divisional director, succeeding **Floyd S. Green,** who is retiring. Mr. Theurer begins his new duties March 1. **R. I. Ogle,** industrial paint sales representative in the Chicago territory, will be industrial sales manager at Milwaukee.

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Charles A. Kirk and **John L. Stainton** have been elected directors, International Business Machines Corp., Endicott, N. Y. Mr. Kirk is vice president in charge of manufacturing, International Business Machines Corp., while Mr. Stainton is president, Central Valley National Bank, Central Valley, N. Y.

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A. W. Baker has been appointed transportation specialist, Atlanta Transportation Department, General Electric Co., Atlanta, Ga., succeeding the late F. A. Kroner. Mr. Baker has been associated with General Electric 24 years, and since the outbreak of war has been assigned to the company's activities in connection with the war effort in the Charleston, S. C., area.

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Gould Grant Rheuby has retired as vice president, director and member of the finance committee of Hercules Powder Co., Wilmington, Del. **Charles A. Bigelow** has resigned from the executive committee to succeed Mr. Rheuby on the finance committee. He is also a vice president.

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Hugh McKibbin, formerly general plant accountant, Eaton Mfg. Co., Cleveland, has been named to the newly created office of assistant controller, jointly with **A. C. Paterson,** formerly assistant secretary. **H. S. Ide Jr.,** company statistician, has been made assistant secretary-treasurer. **Logan Monroe,** formerly assistant treasurer, has become controller.

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Henry D. Felton, controller, Morden Frog & Crossing Works, Chicago, has been advanced to the office of assistant treasurer.

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John T. Hoyt has been appointed comptroller, and **R. C. Gray,** works manager, Robins Conveying Belt Co., Passaic, N. J.

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Henry H. Mandle, president, Metallic Products Corp. and United States Metal Powders Inc., both of New York, has been named a director, Clinton Trust Co., New York. Mr. Mandle is also vice president, International Bronze Powder Ltd., Montreal, and vice president and secretary, United States Bronze Powder Works Inc., New York.

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John J. Fiske has been named electronic control specialist for Westinghouse Electric & Mfg. Co. in the Los Angeles area. He joined Westinghouse at East Pittsburgh, Pa., in mid-1941, and in November of that year was assigned to the general sales department at East Pittsburgh as application engineering correspondent, a post he held until his transfer to Los Angeles.

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Rowland J. Black has been appointed factory manager, Buffalo Arms Corp., Cheektowaga, N. Y. He joined the company in 1941. **Don E. Miller** has been named assistant general manager of Buffalo Arms. **Vernon E. Walters** has become general manager, Houde Engineering Division of Houdaille-Hershey Corp. Houde operates Buffalo Arms.

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Theodore G. Sullivan, associated with the rubber industry since 1918, has joined Foster D. Snell Inc., Brooklyn, N. Y., as research director of the recently expanded rubber and plastic department.

AWARDED MEDALS BY ENGINEERING SOCIETIES

Three General Electric men received awards at the national technical meeting of the American Institute of Electrical Engineers Jan. 27. Dr. G. Wesley Dunlap (left) of the company's general engineering laboratory is showing Gerard Swope, president of the company, and Dr. Willis R. Whitney (right) honorary vice president and founder of the company's research laboratory, an analyzer he used in research work.

Mr. Swope was the sixth recipient of the Hoover Medal, awarded jointly by the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, and American Institute of Electrical Engineers. The award is to engineers "whose pre-eminent services have advanced the well being of mankind and whose talents have been devoted to the development of a richer and more enduring civilization."

The John Fritz Medal was awarded by the same four societies to Dr. Whitney for "distinguished research, both as an individual investigator and as an outstanding and inspiring administrator of pioneering enterprise, co-ordinating pure science with the service of society through industry."

The Alfred Noble prize was awarded to Dr. Dunlap by these four organizations and the Western Society of Engineers for his paper on "The Recovery Voltage Analyzer for Determination of Circuit Recovery Characteristics."

Eastern Foundrymen Approve Lecture Series

A free course on fundamentals of foundry engineering will be presented by the Stevens War Industries Training School, Stevens Institute of Technology. The course has been approved by the Metropolitan (New York) chapter of the American Foundrymen's Association.

Co-ordinated lectures will be presented by experienced foundrymen and engineers. Subject matter will apply to steel, gray iron, malleable iron and nonferrous used for castings. The government is meeting the expense of the course. The program follows:

Feb. 4-5—"Solidification and Cooling Phenomena," W. C. Schulte, metallurgist, Curtiss-Wright Corp., Propeller Division, Passaic, N. J.

Feb. 11, 12, 18, 19, 25—"Pattern Design," William Wagner, vocational arts instructor, Irvington schools, Irvington, N. J., and also Worthington Pump & Machinery Corp., Harrison, N. J.

Feb. 26, March 4—"Molding and Core Sand," C. B. Somers, foundry engineer, Whitehead Bros. Co., New York.

March 5, 11—"Sand Binders and Inhibitors," G. Watson, assistant chemist, American Brake Shoe & Foundry Co., Elizabeth, N. J.

March 12, 18—"Effect of Sand and Facings on Soundness, Finish and Cleaning of Castings," W. Rose, sand engineer, Wright Aeronautical Corp., Paterson, N. J.

March 19—"Permanent Mold and Die Casting Practices," R. E. Ward, assistant chief metallurgical engineer, Eclipse Aviation Division, Bendix Aviation Corp., Bendix, N. J.

March 25, 26—"Directional Solidification of Casting Materials," C. W. Briggs, technical advisor, Steel Founders Society of America, Cleveland.

April 1, 2, 8—"Melting and Pouring," J. A. Bukowski, plant metallurgist, Worthington Pump & Machinery Corp., Harrison, N. J.

April 9—"Cleaning of Castings," Fred Mosely, engineer, Whitehead Bros. Co., New York.

April 15—"Reclamation of Foundry Materials," W. Rose, Wright Aeronautical Corp., Paterson, N. J.

April 16—"Annealing and Heat Treatment," R. E. Ward, Bendix Aviation Corp., Bendix, N. J.

April 22, 23—"Necessity of Proper Foundry Control," F. G. Sefing, metallurgist, International Nickel Co., New York.

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Non-Ferrous Founders Seek To Increase Membership

Non-Ferrous Founders Society, organized nine months ago, will launch a nation-wide drive for membership, it was determined at a meeting in Chicago, Feb. 1, attended by foundrymen from most Central Western states.

At the same meeting, a program of worthwhile service to the industry was set up. The group already has an office in Washington in Room 914, National Press building, which has aided a number of foundries in clearing up material shortages and in getting action on forms.

Chester K. Faunt, of the Christensen & Olsen Foundry Co., Chicago, is chairman of the society s executive committee. R. M. McClure, 111 West Washington street, Chicago, is secretary-treasurer.

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American Society of Tool Engineers—As a result of demands from industry, a machine and tool progress exhibition will be held in conjunction with the society's annual meeting in Milwaukee auditorium, Milwaukee, March 25-27.

Exhibition will be somewhat smaller than previous shows to permit eliminating any exhibits which do not bear directly on the immediate job of simplifying and expediting war production.

Six technical sessions will take the form of symposia on such subjects as Women in Machine Shops, Increasing Tool Life, Tool Salvage, Machining of NE Steels, New Production Technique and Tool Engineering Horizons.

During the show and annual meeting, training films from industry and government will be shown in order to provide educational information to simplify the assimilation of new workers.

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Association of Highway Officials of North Atlantic States — Nineteenth annual meeting at Hotel Pennsylvania, New York, Feb. 17-19, will be in nature of highway problems conference.

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American Management Association—A conference on manpower will be held in Palmer House, Chicago, Feb. 10-12. A feature will be a meeting of management executives and officials of the War Manpower Commission. Paul V. McNutt, chairman, Manpower Commission, will speak at an evening session, Feb. 10.

Pursuant to a recommendation of the War Production Board and the Petroleum Administrator for War, Defense Plant Corp., a subsidiary of Reconstruction Finance Corp., has issued purchase orders covering three hundred thousand 55-gallon, 18-gage, steel drums. These drums are to be used for the transportation, in freight cars, of fuel oil and kerosene from the Gulf Coast to the Atlantic Seaboard.

OBITUARIES . . .

Alexander Cameron, 63, at one time associated with the steel industry for many years, died recently in Syracuse, N. Y. From 1927 to late 1939 he was identified with Lukens Steel Co., Coatesville, Pa., in sales work, and before that specialized principally in sheets, with connections in the East.

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John C. Koch, 59, for over 25 years manager of Darwin & Milner Inc., Cleveland, died in that city, Jan. 27. He was active in the production of high-carbon, high-chromium steel in the United States.

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J. Frederick Hartlieb, 65, president, Continental Can Co. Inc., New York, died Jan. 26, in that city. He joined the company in 1927 as assistant to the president, becoming a vice president in 1928, executive vice president in 1936 and president in 1940.

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Richard F. Howe, 79, secretary, International Harvester Co., Chicago., from 1902 to 1911, died Jan. 26 at his winter home in Aiken, S. C.

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John J. McQuade, a member of the board of directors, Johnson Bronze Co., New Castle, Pa., died in that city, Jan. 26. Mr. McQuade was associated with the company 29 years, 20 years of which were spent in the sales department.

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Chris Sinsabaugh, 71, dean of automotive editors and writers and associated with bicycling and automotive publications since the turn of the century, died at his home in Detroit, Jan. 27. He was active until a few days before his death as editor of *Automotive News.*

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Henry J. Bowerfind, 67, president, Horton Mfg. Co., Fort Wayne, Ind., manufacturer of washing and ironing machines, died Jan. 28.

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William L. Barnes, 86, retired general superintendent of transportation, Chicago, Burlington & Quincy railroad, Chicago, died in La Grange, Ill., Jan. 28.

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Alexander E. Martin, 75, founder, Central Foundry, Milwaukee, which later became the A. E. Martin Foundry Co., died Jan. 8.

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Joseph Taussig, 84, founder and chairman of the board, Reflector Hardware Corp., Chicago, died in that city, Jan. 12.

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Clarence J. Allen, 77, founder of the Worden-Allen Co., Milwaukee, died in that city, recently.

Inland Steel Co.'s Indiana Harbor plant receives production award. Displaying the flag are, left to right: J. H. Walsh, vice president of Inland; Col. F. U. McCoskrie, control division, Sixth Service Command; and John Sabo, chairman of the plant's victory production committee

Cleveland Automatic Machine Co., Cleveland, received the burgee at a ceremony at the Hotel Statler attended by company's 1100 employes. Photo, below, shows, left to right: Capt. E. R. Henning, U. S. Navy, Army and Navy Munitions Board, who presented the pennant; James Hammond, chairman of the board; A. L. Patrick, president; and Lieut. Col. A. F. Witte, Cleveland Ordnance district, who presented "E" lapel pins to employes

War Plants Cited For Performance

War production efforts of additional manufacturing plants have been recognized by the War and Navy Departments through awards of "E" burgees to the companies and of lapel pins to employes. Among the latest cited:

Atlas Imperial Diesel Engine Co., Oakland, Calif.
Field & Flint Co., Brockton, Mass.
Glamorgan Pipe & Foundry Co., Lynchburg, Va.
Scholl Mfg. Co., Inc., Chicago.
United States Machine Corp., Plant No. 2, Lebanon, Ind.
Webber Gage Co., Cleveland.
A. B. Zukert Co., Milwaukee.
Alliance Structural Co., Alliance, O.
Babcock & Wilcox Tube Co., Beaver Falls, Pa.
Batteryless Telephone Equipment Co., Pittsburgh.
Bethlehem Steel Co., Baltimore.
Bison Shipbuilding Corp., North Tonawanda, N. Y.
Chicago-Latrobe Twist Drill Works, Chicago.
Consolidated Steel Corp. Ltd., shipbuilding division, Orange Tex.
Copco Steel & Engineering Co., Detroit.
Worthington Pump & Machinery Corp.,

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Unitcast Corp., Toledo, O., was cited by the services for outstanding production of steel castings for Army and Navy requirements. In photo, Col. Louis C. Wilson, quartermaster for the Fifth Service Command, Fort Hayes, Columbus, J. L. Tillman, vice president of Unitcast, and Frank Lichter, president of Local 48, CIO-UAWA, display the pennant

Moore steam division, Wellsville, N. Y.
Darby Products of Steel Plate Corp., Kansas City.
Dayton Beach Boat Works, Inc., Dayton Beach, Fla.
Edison-Splitdorf Corp., West Orange, N. J.
Edwards & Co., Norwalk, Conn.
Electric Products Co., Cleveland.
Elliot Co., Jeanette, Pa.
Engineering & Research Corp., Riverdale, Md.
Farrell-Cheek Co., Sandusky, O.
F. Ferguson & Co., Hoboken, N. J.
Foote-Pierson Co., Newark, N. J.
General Motors Corp., electromotive division, La Grange Ill.
General Radio Co., Cambridge, Mass.
I. L. G. Electric Ventilating Co., Chicago.
D. O. James Mfg. Co., Chicago.
Lindberg Engineering Co., Chicago.
Markey Machinery Co., Inc., Seattle.
Masonite Corp., Laurel, Miss.
McCallum-Hatch Brnoze Co., Inc., Buffalo.
Missouri Valley Bridge & Iron Co., Leavenworth, Kan.
Monroe Steel Castings Co., Monroe, Mich.
Morrison Brothers Co., Dubuque, Ia.
National Supply Co., Toledo, O.
Oregon Brass Works, Portland, Ore.
Palmer Scott & Co., Inc., New Bedford, Mass.
Penn Electric Switch Co., Goshen, Ind.
Philadelphia Insulated Wire Co., Philadelphia.
John Reiner & Co., Long Island City, N. Y.
Sight Light Corp., Deep River, Conn.
Spencer Lens Co., Buffalo and Cheektowaga, N. Y.
Standard Oil Co. of California, Richmond, Calif.
Stow Mfg. Co., Binghamton, N. Y.
Taylor-Winfield Corp., Fabricating Division, Detroit.
Western Gear Works, Seattle.

Japan's Rubber Conquests Bring Little Revenue

Foreign traders returning to Washington report that the conquest of rich rubber supplies in the Far East has meant little to the Japanese as a source of revenue.

Japan is reportedly offering crude rubber at ⅝ of 1-cent a pound in Singapore, with no buyers. Germans there are said to be purchasing some rubber for storage until means for running the United Nations blockade can be found.

Previous to Japan's entrance into the war, crude rubber brought 22½-cents per pound on the world market.

Dominion Builds Huge Air Power

Steel output at all-time high. . Great hydroelectric plant nears completion

TORONTO, ONT.

DEFENSE construction contracts for the three armed services in the 40-month period ended Dec. 31, 1942, were valued at $355,000,000, the Department of Munitions and Supplies announced. This covers 3700 contracts. In 1942 1733 contracts were placed, aggregating $172,000,000. Most of the work has been for the Royal Canadian Air Force and the British Commonwealth Air Training Program. This includes about 2000 buildings, of which 560 were hangars. Nearly 200 airports have been completed. Many aircraft manufacturing plants have been built and others extended. Much work also has been done for the Army and Navy.

Agreements have been made between the Canadian government and several mining companies, providing special tax credits or allowances for depreciation or depletion under the income tax act and excess profits tax. One agreement is with the Consolidated Mining & Smelting Co. of Canada Ltd. To fulfill a contract with Metals Reserve Co., controlled by the United States government, for 10,000 flasks of mercury during 1942 and 1943 the company would have to incur capital expenditures of about $600,000. The agreement allows a deduction from profits at the rate of $45 for every cask of mercury exported to the United States, up to $300,000 in 1942 and a total of $600,000. Falconbridge Nickel Mines Ltd., which has a contract for 10,000,000 pounds of nickel and must spend $656,725 for facilities, is allowed a deduction of 10 per cent in 1942, 40 per cent in 1943 and 1944 and 10 per cent in 1945.

Department of Munitions and Supply has merged the tank production branch and the automotive production branch with J. H. Perry as director general. The new branch will also supervise the locomotive production program.

Approaching completion of the Shipsaw hydroelectric power development on the upper Saguenay river in Quebec will bring into action a project that rivals Boulder Dam in the United States. Built by the Aluminum Co. of Canada, it will cost about $65,900,000 and will deliver 1,200,000 horsepower of electric energy. In the same district are two other installations producing 840,000 horsepower, giving the district a total of 2,040,000 horsepower, claimed the largest concentration in the world.

Construction was started Oct. 1, 1941, in a region 170 miles deep in the wilderness, where there were no railroads or roads. Men and materials were carried by airplane. The powerhouse is 800 feet long and 12 generators will be installed, each originally planned for 85,000 horsepower, since increased to 100,000 horsepower. It will supply about 20 per cent of all Canada's electric power, more than the proposed St. Lawrence waterway would have furnished and approximately as much as that generated at Niagara by Canadian and American interests.

Electric furnace capacity was increased 12,000 tons during December, to a total annual capacity of 407,000 tons. As of Jan. 1, 1943, capacity for production of steel ingots and castings was 3,444,775 tons, compared with 3,164,000 tons at beginning of 1942.

Production of iron and steel in Canada in 1942 exceeded all prior records.

Comparative figures follow:

	Steel ingots castings	Pig iron	Ferro-alloys
Dec. 1942 . .	269,834	164,382	19,567
Nov. 1942 . .	270,812	170,578	16,733
Dec. 1941 . .	244,844	166,182	19,986
12 Mos. 1942	3,121,361	1,975,015	213,636
12 Mos. 1941	2,701,313	1,528,053	213,219
12 Mos. 1940	2,255,872	1,309,161	151,661

Seized Enemy Patents Offered to U. S. Industry

Fifty thousand patents formerly owned by residents of enemy and enemy-occupied countries have been seized by the United States government through the Alien property custodian and are being offered for use by United States industry.

The alien property custodian has prepared a statement of policy, an index of patents vested in his office, and classified lists of the vested patents.

Classified lists of the vested patents may be obtained from the Office of Alien Property Custodian, Chicago. Most lists are priced at 10 cents, although a few are 25 cents. There are more than 300 classified lists covering a wide variety of subjects.

Printed copies of vested patents and drawings and specifications of vested patent applications may be obtained from the Commissioner of Patents, Washington, for 10 cents each.

Applications for license to use a vested patent should be sent to the Office of Alien Property Custodian, Washington. An application fee of $50, plus $5 for each additional related patent to be covered in one license is charged.

Industry Mobilized for Tasks Which Lie Ahead

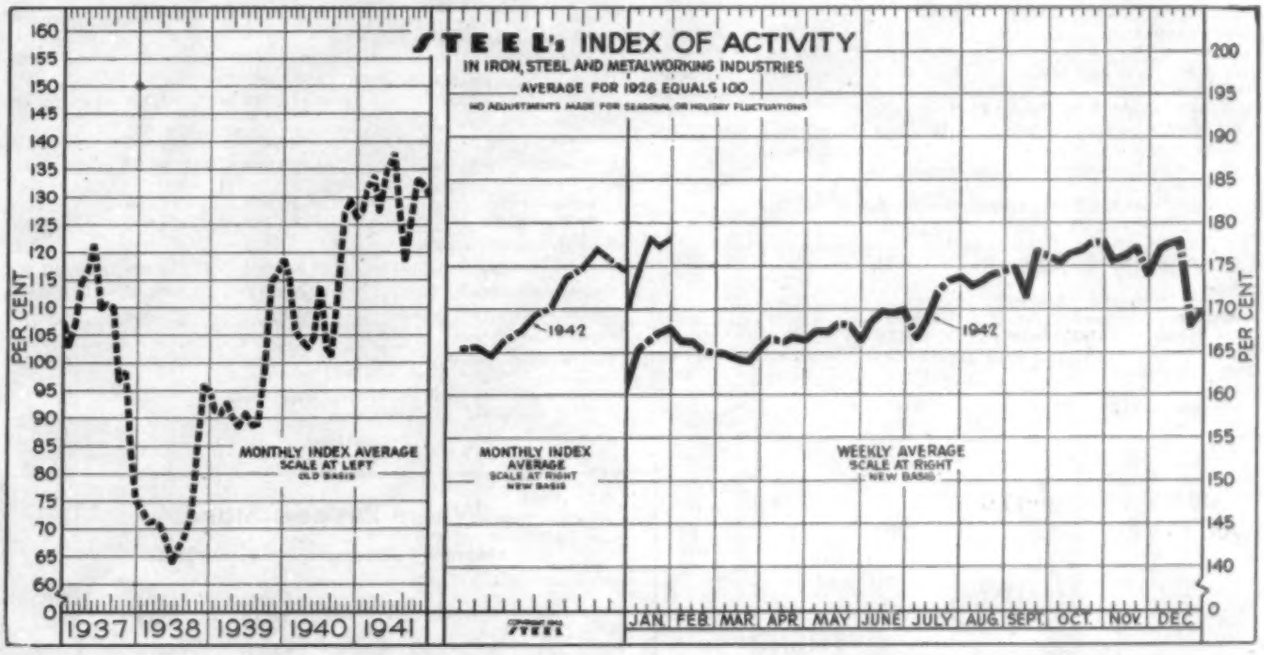
THE COURSE of production to fulfill maximum requirements for waging a successful war is still in the charting stage due to fluidity of specifications and reservations on commitments enforced by the nature of the conflict. But industry has emerged from the "shake-down" phase, and with the remarkable record of 1942 behind it, moves toward attainment of this year's known goals with more confidence and greater productive strength.

In December armament industries turned out a total of war supplies five times as great as in the month before Pearl Harbor, the greatest volume of ordnance items, tanks and aircraft ever produced in one month, according to WPB figures. The board's munitions index rose 14 per cent over November to 497, reflecting an increase of 20 per cent in output of planes and gain of 25 per cent in ground ordnance, tanks and artillery.

Internal bottlenecks which have appeared in certain parts and small equipment are in process of being eliminated. Better scheduling of materials to assure complete utilization is due under the Controlled Materials Plan. Manpower remains the No. 1 problem.

Steel ingot production declined ½-point to 98.5 per cent in the period ended Jan. 30 as furnaces went down for repairs. However, operations held within a relatively narrow range over the month, fluctuating between 97.5 and 99 per cent of capacity. With recent narrowing of the spread between iron production and war needs, supply conditions appear to have eased somewhat. Encouragement is felt regarding the scrap situation. Inventories at consuming plants are increasing and reports indicate the rise in stocks may continue despite severe weather.

STEEL's index of activity continued its upward trend,



STEEL'S index of activity rose ½-point to 177.7 in the week ending Jan. 30:

Week Ended	1943	1942
Jan. 30	177.7†	167.9
Jan. 23	177.2	167.4
Jan. 16	177.9	166.6
Jan. 9	175.7	165.6
Jan. 2	170.0	161.0
Week Ended	**1942**	**1941**
Dec. 26	167.8	120.5
Dec. 19	178.0	132.9
Dec. 12	177.6	134.0
Dec. 5	177.1	133.4

†Preliminary.

Mo. Data	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931
Jan.	165.7	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1
Feb.	165.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5
March	164.8	153.9	104.1	92.6	71.2	114.4	87.7	88.1	78.9	44.5	54.2	80.4
April	166.7	127.9	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0
May	167.7	134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6
June	169.4	158.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1
July	171.0	128.7	102.4	83.5	66.2	110.4	100.1	75.5	63.7	77.1	47.1	67.3
Aug.	173.5	118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4
Sept.	174.8	126.4	113.5	98.0	72.5	96.5	86.7	69.7	56.9	68.0	46.5	64.8
Oct.	176.9	133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2
Nov.	175.8	132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4
Dec.	174.1	130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.9

Note: Weekly and monthly indexes for 1942 and 1943 have been adjusted to offset the forced curtailment in automobile production and to more accurately reflect expanding steel production

sustained since the first of the year, reaching 177.7 in the final week of January. This compares with 167.9 in the like week a year ago. High point touched by the index was 178.0 in the week ending Dec. 19.

Electric power output for the period closed Jan. 30 established a new record high of 3,976,844,000 kilowatt hours, contrasting with total of 3,468,193,000 kilowatts in the corresponding 1942 week, an increase of 14.7 per cent. As a precaution against anticipated shortages in this field later in the year, measures have been taken to consolidate control over power facilities in a War Production Board sub-authority.

Preliminary report of revenue freight carloadings indicates the loss of approximately 46,400 cars recorded in the week ended Jan. 23, when loadings fell from previous week's peak to 708,578, will be partially offset by month-end gains. Top week in car use during the month ended Jan. 16 with 755,000 units.

BUSINESS BAROMETER

Financial Indicators

	Dec., 1942	Nov., 1942	Dec., 1941
30 Industrial Stocks*	117.16	115.31	110.67
20 Rail Stocks*	26.83	28.13	25.35
15 Utilities*	14.02	14.16	14.38
Par value of all listed bonds, N.Y.S.E. (000 omitted)	$7,293,000	$6,716,000	$5,824,000
Bank Clearings daily average (000 omitted)	$1,392,183	$1,331,843	$1,274,686
Commercial Paper, interest rate (4-6 months)	0.69%	0.69%	0.56%
Com'l loans, (000 omitted)‡	$10,321,000	$10,295,000	$11,370,000
Federal Reserve ratio (per cent)	76.3	79.1	90.8
Capital flotations (000 omitted)†			
New Capital	$29,029	$28,265	$108,600
Refunding	$68,842	$86,856	$124,703
Federal gross debt (mil. of dol.)	$108,170	$96,116	$58,020
Railroad earnings†	$148,948,998	$184,680,008	$68,933,024
Stock sales, New York Stock Exchange	19,312,762	13,437,025	36,390,492

†November, October, November, respectively.
*Dow-Jones series.
‡Leading member banks Federal Reserve System.

Commodity Prices

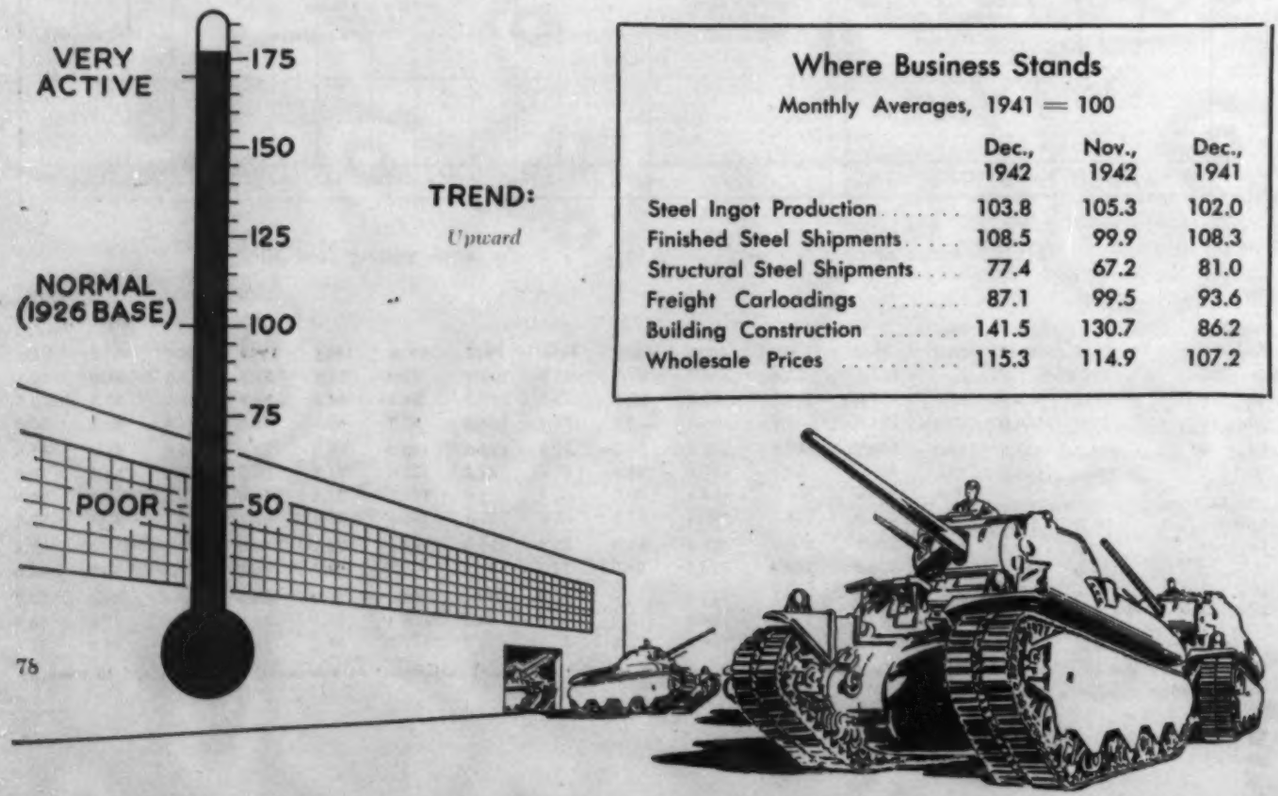
STEEL's composite finished steel price average	$56.73	$56.73	$56.73
U. S. Bureau of Labor's Index	100.7‡	100.3	93.6
Wheat, cash (bushel)	$1.325	$1.32	$1.285
Corn, cash (bushel)	$1.10	$1.09	$0.83

‡Preliminary.

Industrial Indicators

	Dec., 1942	Nov., 1942	Dec., 1941
Commerce Dept.'s Mfgs. Index†			
Orders‡	278.0	266.0	212.0
Shipments‡	233.0	228.0	183.0
Inventories‡	175.7	176.4	152.7
Munitions Output Index (WPB)	497	435	133
Iron and Steel Scrap consumption (tons)†	4,621,000	4,883,000	4,482,000
Gear Sales Index	300	359	243
Foundry equipment new order index	382.5	338.8	481 1
Finished steel shipments (net tons)	1,849,635	1,665,545	1,846,036
Ingot output (average weekly; net tons)	1,652,303	1,674,723	1,617,718
Dodge bldg. awards in 37 states ($ Valuation)	$708,716,000	$654,184,000	$431,626,000
Fabricated structural steel shipments (Tons)	145,280	130,425	176,126
Coal output, tons	48,390,000	46,800,000	46,667,000
Coke Production (Daily Av.)			
Beehive	22,000	22,106	22,100
By-Product	173,163	173,029	167,500
Business failures; number†	585	673	842
Business failures; liabilities†	$5,245,000	$7,181,000	$9,197,000
Cement production, bbls.†	16,240,000	18,260,000	14,930,000
Cotton consumption, bales	935,511	913,038	888,379
Freight Car Awards	135	0	8,406
Car loadings (weekly av)	708,600	809,000	761,455

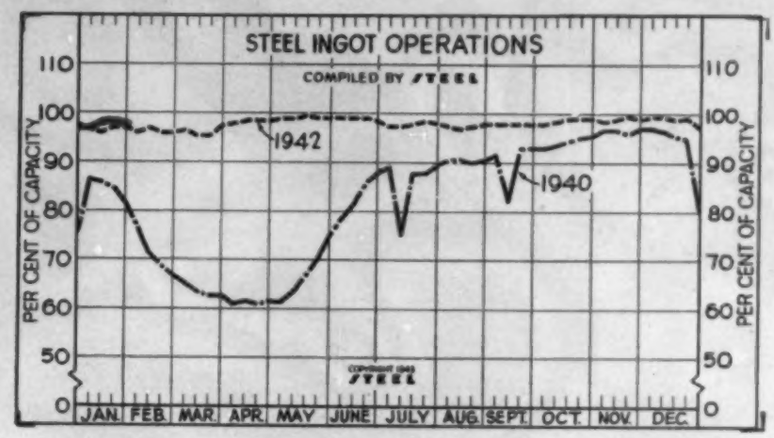
†November, October, November, respectively.
*Not available. ‡Preliminary.



Where Business Stands

Monthly Averages, 1941 = 100

	Dec., 1942	Nov., 1942	Dec., 1941
Steel Ingot Production	103.8	105.3	102.0
Finished Steel Shipments	108.5	99.9	108.3
Structural Steel Shipments	77.4	67.2	81.0
Freight Carloadings	87.1	99.5	93.6
Building Construction	141.5	130.7	86.2
Wholesale Prices	115.3	114.9	107.2



Steel Ingot Operations

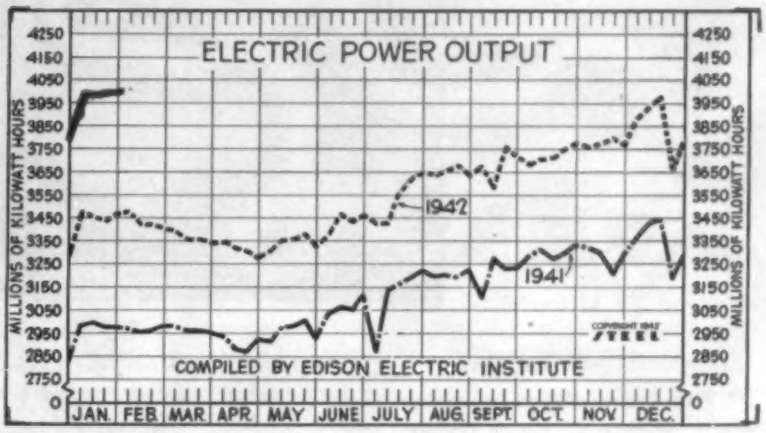
(Per Cent)

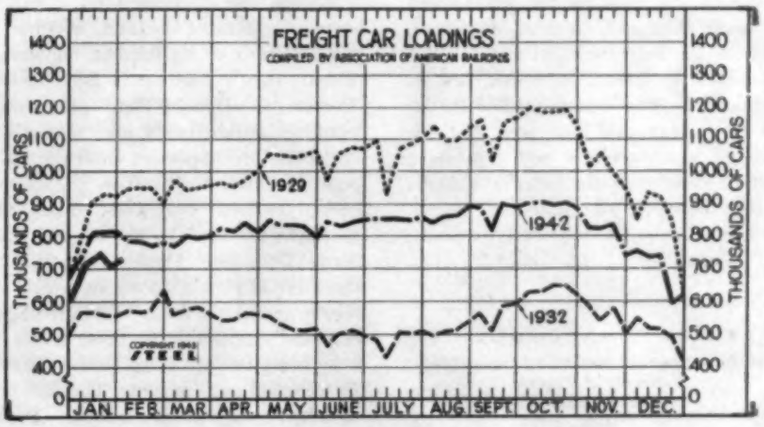
Week ended	1943	1942	1941	1940
Jan. 30	98.5	97.0	97.0	76.5
Jan. 23	99.0	97.0	95.5	81.5
Jan. 16	99.0	96.0	94.5	84.5
Jan. 9	97.5	96.5	93.0	86.0
Jan. 2	97.5	97.5	92.5	86.5
Week ended	**1942**	**1941**	**1940**	**1939**
Dec. 26	99.0	93.5	80.0	75.5
Dec. 19	99.0	97.5	95.0	90.5
Dec. 12	99.5	97.5	95.5	92.5
Dec. 5	99.5	96.5	96.5	94.0
Nov. 28	99.0	95.0	97.0	94.0
Nov. 21	99.5	95.5	97.0	93.5
Nov. 14	99.0	97.0	96.0	93.5
Nov. 7	98.5	97.5	96.5	93.0
Oct. 31	99.0	95.5	96.5	93 0
Oct. 24	99.0	95.5	95.5	92.0

Electric Power Output

(Million KWH)

Week ended	1943	1942	1941	1940
Jan. 30	3,977	3,468	2,830	2,541
Jan. 23	3,974	3,440	2,980	2,661
Jan. 16	3,952	3,450	2,996	2,674
Jan. 9	3,953	3,473	2,955	2,688
Jan. 2	3,780	3,289	2,831	2,558
Week ended	**1942**	**1941**	**1940**	**1939**
Dec. 26	3,656	3,234	2,757	2,465
Dec. 19	3,976	3,449	3,052	2,712
Dec. 12	3,938	3,431	3,004	2,674
Dec. 5	3,884	3,368	2,976	2,654
Nov. 28	3,766	3,295	2,932	2,605
Nov. 21	3,795	3,205	2,839	2,561
Nov. 14	3,776	3,305	2,890	2,587
Nov. 7	3,762	3,326	2,858	2,589
Oct. 31	3,775	3,339	2,882	2,609


ELECTRIC POWER OUTPUT
MILLIONS OF KILOWATT HOURS
1942
1941
COMPILED BY EDISON ELECTRIC INSTITUTE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.



Freight Car Loadings

(1000 Cars)

Week ended	1943	1942	1941	1940
Jan. 30	742†	816	714	657
Jan. 23	709	818	711	649
Jan. 16	755	811	703	646
Jan. 9	716	737	712	668
Jan. 2	621	674	614	592
Week ended	**1942**	**1941**	**1940**	**1939**
Dec. 26	592	607	545	550
Dec. 19	743	799	700	655
Dec. 12	740	807	756	681
Dec. 5	760	833	739	687
Nov. 28	844	866	729	689
Nov. 21	836	799	733	677
Nov. 14	827	884	745	771
Nov. 7	829	874	778	786

†Preliminary.

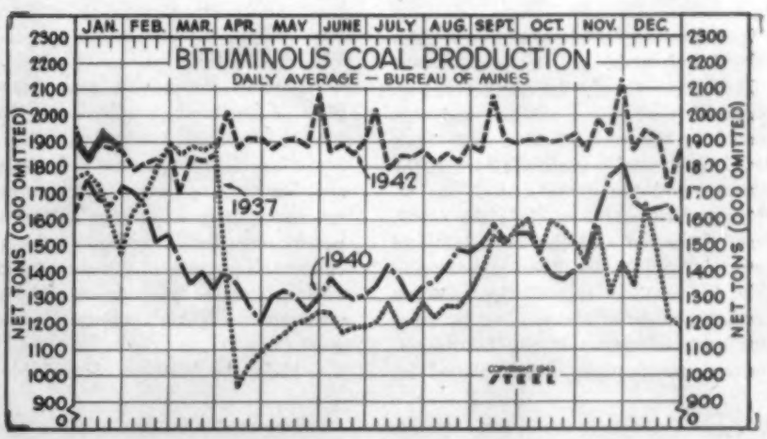
Bituminous Coal Production

Daily Average

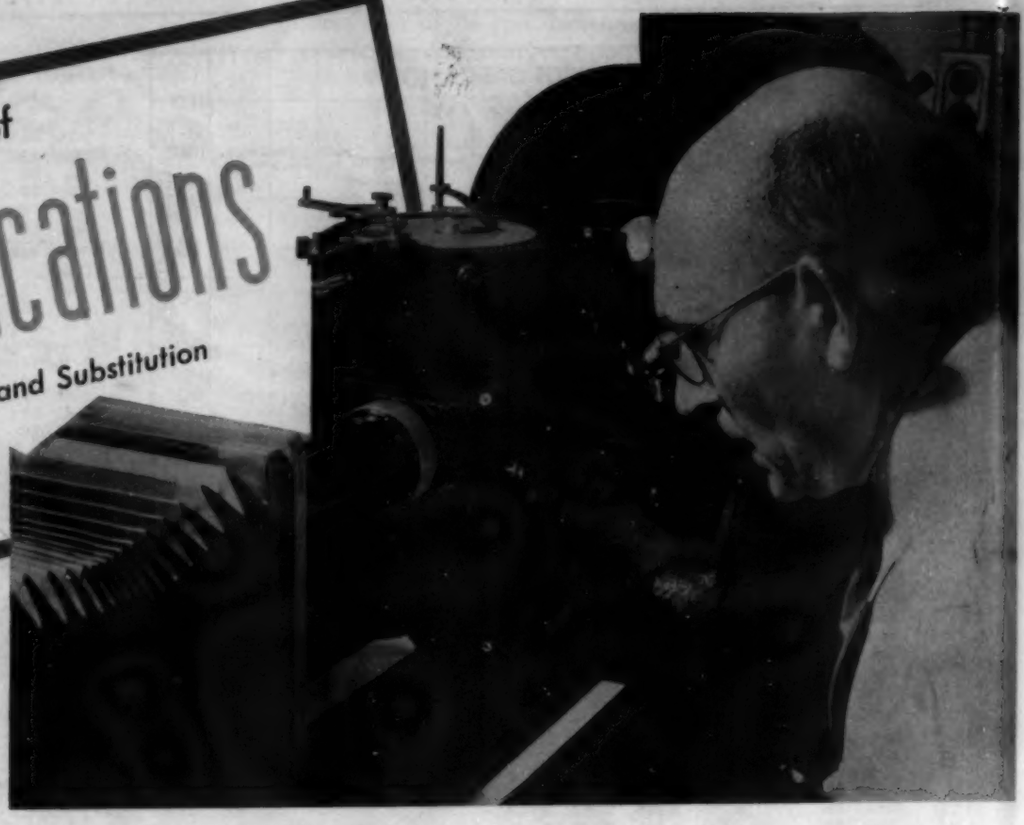
Net Tons (000 omitted)

Week ended	1943	1942	1941	1937
Jan. 23	1,875†	1,886	1,656	1,605
Jan. 16	1,929	1,883	1,609	1,731
Jan. 9	1,833	1,842	1,691	1,780
Jan. 2	1,860	1,960	1,762	1,764
Week ended	**1942**	**1941**	**1940**	**1937**
Dec. 26	1,714	1,632	1,591	1,230
Dec. 19	1,913	1,792	1,656	1,477
Dec. 12	1,944	1,817	1,645	1,669
Dec. 5	1,853	1,813	1,636	1,347
Nov. 28	2,149	1,958	1,674	1,444
Nov. 21	1,925	1,615	1,815	1,318
Nov. 14	1,989	1,988	1,773	1,580

†Preliminary.


BITUMINOUS COAL PRODUCTION
DAILY AVERAGE — BUREAU OF MINES
NET TONS (000 OMITTED)
1942
1937
1940
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

The Functions of specifications In Conservation and Substitution



Section 12 in a Series on Conservation and Substitution

(Concluded from Last Week)

TO THE LAYMAN, and to the average engineer to some extent, the term "specifications" has rather a dull and uninteresting sound. But if viewed from the vantage point of the control center of our war production program, they appear not as colorless documents but as functioning parts of a mighty production program. Realizing their multiple function, we may even find excitement in tracing their development and following their application.

There are three elements which are so limited that the efficiency and ingenuity with which they are applied will greatly affect the outcome of the present war. These elements are: *Time*, *Materials* and *Manpower*. Any device by which these elements can most effectively be conserved is a potent tool which should be skillfully developed and carefully applied.

Specifications are one of the most valuable of such tools.

They represent the experience and research of many years, selected and condensed for the most effective use. They classify and catalog materials so that the engineer and the manufacturer can select, purchase and inspect as the conditions of service and the availability of materials may require. They make it possible to practice conservation without sacrificing safety or effectiveness by using each material where it can best serve. Further, specifications are developed for new materials and processes to broaden their applications, thus speeding production and conserving manpower.

Commercial specifications and those developed and used by the government are much alike and, in many instances, identical in their technical details. But government specifications, which must be developed by one group, applied in design by another, and then used by thousands of manufacturers and inspectors, must be more than the basis of a single contract between purchaser and vendor. They must serve the following purposes:

—Provide means for standardization and simplification.

—Provide the quality and characteristics of materials required for the intended functional service.

—Serve as a simple and definite standard for acceptance or rejection by inspectors who may not have either the experience or the knowledge of the application and purpose of the material necessary to exercise the discretion which is common in regular commercial procurement.

—Make the best use of available materials.

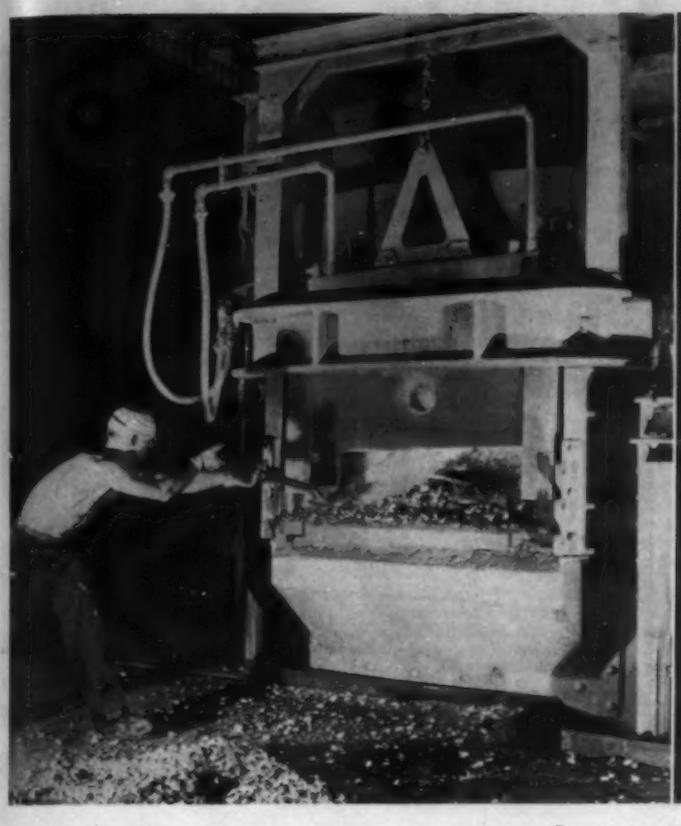
—Protect the government as well as legitimate suppliers from unscrupulous practices.

—Since specifications form a part of every procurement contract, whether for raw materials or for finished implements of war, they consequently become legal documents. Hence their phraseology, technical requirements and methods of inspection are important from the standpoint of possible litigation.

By ARTHUR F. MACCONOCHIE
Head, Department of Mechanical Engineering
University of Virginia
University Station, Va.
And
Contributing Editor, STEEL

As outlined here last week, the specifications used by the United States Army Ordnance Department fall into three broad classifications, to which as a fourth are added those "Tentative Specifications" applicable to items under development or subject to further changes in technical requirements. The first three divisions mentioned include *Federal Specifications* developed by co-operative action of all interested departments of the federal government; *Emergency Alternate Federal Specifications* evolved as a result of the shortage or entire absence of certain materials and manufactured articles normally available under peacetime conditions; and *United States Army Specifications*, which cover special military items as well as articles procured through the ordinary channels of commerce.

After the conclusion of World War I, the War Department adopted a firm policy of basing specifications upon standard commercial practice, insofar as prac-



Opposite page—War Department specification functioning in the laboratory of one of our largest steel plants. A metallurgical chemist checks quality on a high power miscroscope. Allegheny Ludlum Steel photo from OEM

Left, above—Exacting investigations by the Ordnance Department have reduced the number of shovelfuls of alloying elements this workman is adding to the bath of steel in this 35-ton electric arc furnace. Every pound counts. OEM photo by Palmer

Right—This unusual photo shows the slag layer on top of the molten steel in the hearth of an electric arc furnace. The slag prevents oxidation, thereby preserving the high quality of the precious alloy steel. OEM photo by Palmer

ticable. *United States Army Specifications for steels are examples of the application of this policy.* Indeed many government specifications have technical or quality requirements identical with those of technical societies. Obviously such industrial specifications must be incorporated into the government system in order to fulfill the purposes outlined above.

Since industrial and technical organizations should be free to alter the specifications which they sponsor, without reference to agencies of government, it is obviously desirable and necessary that such specifications, when adopted by the War Department, should carry some prefix such as WD (War Department); otherwise critical changes might occur in government specifications without either the knowledge or the approval of industrial and technical organization men.

As an example, War Department specifications for structural steel are based on the widely used standards of the American Society for Testing Materials. Again, specifications for steel bars and billets are maintained in close agreement with those of the Society of Automotive Engineers, through whose courtesy the War Department adopted and used the same system of numerical designations, the familiar SAE numbers indicating to all regular users the composition of the steel. In order that these designations might be readily recognizable, yet distinctive as pertaining to United States Army Specifications, the standard numerical designations were prefixed by "WD" instead of "SAE". This policy of co-operating with and profiting by commercial standards procedures is reflected in all Army specifications, especially those covering materials.

Within the past two years, another set of standard steel compositions has been developed by co-operative action of the steel industry and the American Iron and Steel Institute, these new standards being subsequently adopted by other technical societies including the Society of Automotive Engineers and American Society for Testing Materials. Unfortunately, the promulgation of these standards occurred after the War Department had become deeply involved in the "Emergency" procurement program, and the Army Ordnance Department had already let contracts for war material amounting to more than *seven billion dollars.* Had the War Department immediately followed suit, corrections in millions of drawings would have been necessary, hundreds of millions of blueprints of necessity reissued, and all inspectors recalled for further training. Army personnel and industrialists alike agreed that the war effort could best be served by the retention of the present government system. After the war we can begin to think about necessary adjustments which can then be made without detriment to our immediate and pressing national interest.

The apparent differences in the steel specifications of the Army and those of the AISI-ASTM-SAE are misleading to many engineers. There is, in fact, little difference in the end result. The limits on composition of Army Specifications are maximum and minimum quite definitely and without cavil. Each quantity or "lot" of steel and each piece of the lot are required to fall within those limits or be subject to rejection. Not every piece is analyzed, of course, but representative samples are selected at random

and acceptance or rejection of the entire lot is based on their analyses.

The AISI-ASTM-SAE chemistry ranges are based upon ladle analyses and do not represent the final acceptance or rejection limits. To those nominal ranges are added positive and negative tolerances (the amount, in any given case, being dependent upon the area of the bar and the nominal range) for check analyses. Additional allowances, further, are made for the errors of the chemist. Those tolerances can only be applied in one direction for each lot; that is, the same lot may not have pieces both under and over the nominal range. However, successive lots may vary both over and under the nominal limits. Hence heat-treating cycles, welding and other fabricating procedures must be adjustable to include both plus and minus tolerances.

A comparison of the practical end results in the case of a few examples may serve to clarify the operation of these systems, the method of arriving at the total range for carbon being illustrated in Table I. A similar procedure would apply to all other elements.

By applying the tolerances for the other elements in a similar manner, the final permissible analyses for the grades in Table I would be as shown in Table II.

Thus it may be observed that the small end-point differences in chemical ranges of these two systems are negligible and of no practical consequence. There has been a great deal of criticism of one or both of these systems by various industrial engineers and procurement agents—criticism which still exists in some quarters. This is doubtless the result of a lack of thorough understanding of both systems and especially of a close acquaintance with the advantages and needs of the systems in their respective fields. There is an ancient injunction concerning the removal of the beam from one's own eye, which might well be taken to heart in this connection.

A part of the War Department Spec. 57-107D, *Steel, Carbon and Alloy Bars,* Amendment 5, dated Nov. 5, 1942, is exhibited as Table III. This series sets forth the chemical requirements of some 80 or more steels, as compared to the 1000 or 1200 in common use by American industry before the war. Furthermore, approximately 20 grades have been deleted, while 30 or more new compositions have been added within the past year. Of the latter, at least 25 are the new lean-alloy steels (NE steels) developed by the steel industry.

From Table III it will be noted that a large number of the so-called NE (National Emergency) steels are included—namely, the 8600, 8700, 8900,

(*Please turn to Page* 111)

TABLE I—Range Comparison, in Per Cent

Grade	Size	Nominal Range	Tolerances for Check Analyses	Chemist's Tolerances	Final Carbon Range
WD-1020	All	.15-.25	None	None	.15-125
AISI-C1020	All	.18-.23	Plus or minus .01	Plus or minus .01	.16-.25
WD-1035	All	.30-.40	None	None	.30-.40
AISI-C1035	Smaller than 0.75 sq. in.	.32-.38	Plus or minus .01	Plus or minus .02	.29-.41
AISI-C1035	Greater than 0.75 sq. in.	.32-.38	Plus or minus .01	Plus or minus .02	.28-.42
WD-4140	Under 100 sq. in.	.35-.45	None	None	.35-.45
AISI-A4140	Under 100 sq. in.	.38-.43	Plus or minus .02	None	.36-.45

TABLE II—Final Tolerance Range, in Per Cent

Grade	Size	Carbon	Manganese	Phosphorus	Sulphur	Chromium	Molybdenum
WD-1020	All	.15-.25	.25-.60	.045	.055	.....	.....
AISI-C1020	All	.16-.25	.25-.55	.050	.060	.....	.....
WD-1035	Smaller than .75 sq. in.	.30-.40	.55-.90	.045	.055	.....	.....
AISI-C1035	Smaller than .75 sq. in.	.29-.41	.55-.95	.050	.060	.....	.....
WD-1035	Over .75 in. Rd.	.30-.40	.55-.90	.045	.055	.....	.....
AISI-C1035	Over .75 in. Rd.	.28-.42	.56-.96	.053	.063	.....	.....
WD-4140	Under 100 sq. in.	.35-.45	.70-1.00	.040	.050	.80-1.10	.13-.20*
AISI-4140	Under 100 sq. in.	.36-.45	.71-1.04	.045	.045	.75-1.15	.15-.20**

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* Army Spec. 57-107 D, Amendment 5, dated Nov. 5, 1942, revised the molybdenum content of WD-41XX steel from .15-.25 per cent. (See reference below).

***AISI Steel Products Manual No.* 10 lists AISI-A4140 as .15-.25 molybdenum, but the institute has also adopted similar steels having a molybdenum range of .14-.19. Revision of *Manual No.* 10 will list this grade.

TABLE III—War Department Steel Specifications; Chemical Requirements

W.D. Steel No.	Carbon Range Per Cent	Manganese Range Per Cent	Phosphorus Maximum Per Cent	Sulphur Maximum Per Cent
Carbon Steels				
1010	0.05-0.15	0.25-0.60	0.045	0.055
1015	0.10-0.20	0.25-0.60	0.045	0.055
X 1015	0.10-0.20	0.65-1.00	0.045	0.055
1020	0.15-0.25	0.25-0.60	0.045	0.055
X 1020	0.15-0.25	0.65-1.00	0.045	0.055
1025	0.20-0.30	0.25-0.60	0.045	0.055
1035	0.30-0.40	0.55-0.90	0.045	0.055
1040	0.35-0.45	0.55-0.90	0.045	0.055
1045	0.40-0.50	0.55-0.90	0.045	0.055
1050	0.45-0.55	0.55-0.90	0.045	0.055
1055	0.50-0.60	0.55-0.90	0.040	0.055
1060	0.55-0.70	0.55-0.90	0.040	0.055
1065	0.60-0.75	0.55-0.90	0.040	0.055
1070	0.65-0.80	0.55-0.90	0.040	0.055
1075	0.70-0.85	0.55-0.90	0.040	0.055
1080	0.75-0.90	0.55-0.90	0.040	0.055
1085	0.80-0.95	0.55-0.90	0.040	0.055
1090	0.85-1.00	0.55-0.90	0.040	0.055
1095	0.90-1.05	0.25-0.50	0.040	0.055
Free-Cutting Steels				
1112	0.08-0.16	0.60-0.90	0.09 -0.13	0.10 -0.23
X 1112	0.08-0.16	0.60-0.90	0.09 -0.13	0.20 -0.32
1115	0.10-0.20	0.70-1.00	0.045 Max.	0.075-0.15
X 1314	0.10-0.20	1.00-1.30	0.045 Max.	0.075-0.15
X 1315	0.10-0.20	1.30-1.60	0.045 Max.	0.075-0.15
X 1335	0.30-0.40	1.35-1.65	0.045 Max.	0.075-0.15
X 1340	0.35-0.45	1.35-1.65	0.045 Max.	0.075-0.15

W.D. Steel No.	Carbon Range Per Cent	Manganese Range Per Cent	Phosphorous Maximum Per Cent (1)	Sulphur Maximum Per Cent (1)
Manganese Steels (2)				
1335	0.30-0.40	1.60-1.90	0.040	0.050
1340	0.35-0.45	1.60-1.90	0.040	0.050
1345	0.40-0.50	1.60-1.90	0.040	0.050
1350	0.45-0.55	1.60-1.90	0.040	0.050

W.D. Steel No.	Carbon Range Per Cent	Manganese Range Per Cent	Phosphorous Maximum Per Cent (1)	Sulphur Maximum Per Cent (1)	Nickel Range Per Cent
Nickel Steels (2)					
2315	0.10-0.20	0.30-0.60	0.040	0.050	3.25-3.75
2330	0.25-0.35	0.50-0.80	0.040	0.050	3.25-3.75
2340	0.35-0.45	0.60-0.90	0.040	0.050	3.25-3.75

W.D. Steel No.	Carbon Range Per Cent	Manganese Range Per Cent	Phosphorus Maximum Per Cent (1)	Sulphur Maximum Per Cent (1)	Nickel Range Per Cent	Chromium Range Per Cent
Nickel-Chromium Steels (2)						
3115	0.10-0.20	0.30-0.60	0.040	0.050	1.00-1.50	0.45-0.75
3120	0.15-0.25	0.50-0.80	0.040	0.050	1.00-1.50	0.45-0.75
3135	0.30-0.40	0.50-0.80	0.040	0.050	1.00-1.50	0.45-0.75

W.D. Steel No.	Carbon Range Per Cent	Manganese Range Per Cent	Phosphorus Maximum Per Cent (1)	Sulphur Maximum Per Cent (1)	Nickel Range Per Cent	Chromium Range Per Cent
3140	0.35-0.45	0.60-0.90	0.040	0.050	1.00-1.50	0.45-0.75
X 3140	0.35-0.45	0.60-0.90	0.040	0.050	1.00-1.50	0.60-0.90
3145	0.40-0.50	0.60-0.90	0.040	0.050	1.00-1.50	0.45-0.75
3240	0.35-0.45	0.30-0.60	0.040	0.050	1.50-2.00	0.90-1.25
3250	0.45-0.55	0.30-0.60	0.040	0.050	1.50-2.00	0.90-1.25
3312	Max. 0.17	0.30-0.60	0.040	0.050	3.25-3.75	1.25-1.75

Molybdenum Steels (2)

W.D. Steel No.	Carbon Range Per Cent	Manganese Range Per Cent	Phosphorous Maximum Per Cent (1)	Sulphur Maximum Per Cent (1)	Chromium Range Per Cent	Nickel Range Per Cent	Molybdenum Range Per Cent
4020	0.15-0.25	0.60-0.90	0.040	0.050	....	....	0.20-0.30
4030	0.25-0.35	0.60-0.90	0.040	0.050	....	....	0.20-0.30
4035	0.30-0.40	0.70-1.00	0.040	0.050	....	....	0.20-0.30
4040	0.35-0.45	0.70-1.00	0.040	0.050	....	....	0.20-0.30
4045	0.40-0.50	0.70-1.00	0.040	0.050	....	....	0.20-0.30
4050	0.45-0.50	0.70-1.00	0.040	0.050	....	....	0.20-0.30
4060	0.55-0.70	0.70-1.00	0.040	0.050	....	....	0.20-0.30

Molybdenum Steels (2)

W.D. Steel No.	Carbon Range Per Cent	Manganese Range Per Cent	Phosphorus Maximum Per Cent (1)	Sulphur Maximum Per Cent (1)	Chromium Range Per Cent	Nickel Range Per Cent	Molybdenum Range Per Cent
X 4130	0.25-0.35	0.40-0.60	0.040	0.050	0.80-1.10	....	0.13-0.20
4140	0.35-0.45	0.70-1.00	0.040	0.050	0.80-1.10	....	0.13-0.20
4150	0.45-0.55	0.70-1.00	0.040	0.050	0.80-1.10	....	0.13-0.20
X 4340	0.35-0.45	0.60-0.90	0.040	0.050	0.60-0.90	1.65-2.00	0.20-0.30
4615	0.10-0.20	0.40-0.70	0.040	0.050	....	1.65-2.00	0.20-0.30
4640	0.35-0.45	0.50-0.80	0.040	0.050	....	1.65-2.00	0.20-0.30
4815	0.10-0.20	0.40-0.60	0.040	0.050	....	3.25-3.75	0.20-0.30
4820	0.15-0.25	0.40-0.60	0.040	0.050	....	3.25-3.75	0.20-0.30

Chromium Steels (2)

W.D. Steel No.	Carbon Range Per Cent	Manganese Range Per Cent	Phosphorous Maximum Per Cent (1)	Sulphur Maximum Per Cent (1)	Chromium Range Per Cent
5150	0.45-0.55	0.60-0.90	0.040	0.050	0.80-1.10
52100	0.95-1.10	0.20-0.50	0.030	0.035	1.20-1.50

Chromium Vanadium Steels (2)

W.D. Steel No.	Carbon Range Per Cent	Manganese Range Per Cent	Phosphorous Maximum Per Cent (1)	Sulphur Maximum Per Cent (1)	Chromium Range Per Cent	Vanadium Min. Per Cent	Vanadium Desired Per Cent
6150	0.45-0.55	0.60-0.90	0.040	0.050	0.80-1.10	0.15	0.18

Nickel-Chromium-Molybdenum Steels (2)

W.D. Steel No.	Carbon Range Per Cent	Manganese Range Per Cent	Phosphorous Maximum Per Cent (1)	Sulphur Maximum Per Cent (1)	Nickel Range Per Cent	Chromium Range Per Cent	Molybdenum Range Per Cent
8615	0.10-0.20	0.70-1.00	0.040	0.050	0.40-0.60	0.40-0.60	0.15-0.25
8620	0.15-0.25	0.70-1.00	0.040	0.050	0.40-0.60	0.40-0.60	0.15-0.25
8630	0.25-0.35	0.70-1.00	0.040	0.050	0.40-0.60	0.40-0.60	0.15-0.25
8720	0.15-0.25	0.70-1.00	0.040	0.050	0.40-0.60	0.40-0.60	0.20-0.30
8725	0.20-0.30	0.70-1.00	0.040	0.050	0.40-0.60	0.40-0.60	0.20-0.30
8740	0.35-0.45	0.70-1.00	0.040	0.050	0.40-0.60	0.40-0.60	0.20-0.30
8745	0.40-0.50	0.70-1.00	0.040	0.050	0.40-0.60	0.40-0.60	0.20-0.30
8750	0.45-0.55	0.70-1.00	0.040	0.050	0.40-0.60	0.40-0.60	0.20-0.30
8950	0.45-0.55	1.00-1.30	0.040	0.050	0.40-0.60	0.40-0.60	0.30-0.40

Pulling an ingot from the soaking pit. Huge rolls will convert it to a bloom for the slabbing, billet or sheet bar mill for further conversion. OEM photo by Palmer

Silicon-Manganese And Silicon-Manganese-Chromium Steels

W.D. Steel No.	Carbon Range Per Cent	Manganese Range Per Cent	Phosphorous Maximum Per Cent (1)	Sulphur Maximum Per Cent (1)	Silicon Range Per Cent	Chromium Range Per Cent
9260	0.55-0.65	0.70-1.00	0.040	0.050	1.80-2.00	....
X 9260	0.55-0.65	0.70-1.00	0.040	0.050	1.80-2.20	0.20-0.40

Manganese-Silicon-Chromium-Nickel-Molybdenum Steels

W.D. Steel No.	Carbon Range Per Cent	Manganese Range Per Cent	Phosphorous Maximum Per Cent	Sulphur Maximum Per Cent	Silicon Range Per Cent	Chromium Range Per Cent	Nickel Range Per Cent	Molybdenum Range Per Cent
9415	0.10-0.20	0.80-1.10	0.040	0.050	0.40-0.60	0.20-0.40	0.20-0.40	0 08-0.15
9420	0.15-0.25	0.80-1.10	0.040	0.050	0.40-0.60	0.20-0.40	0.20-0.40	0.08-0.15
9430	0.25-0.35	0.90-1.20	0.040	0.050	0.40-0.60	0.20-0.40	0.20-0.40	0.08-0.15
9440	0.35-0.45	0.90-1.20	0.040	0.050	0.40-0.60	0.20-0.40	0.20-0.40	0.08-0.15
9445	0.40-0.50	1.00-1.30	0.040	0.050	0.40-0.60	0.20-0.40	0.20-0.40	0.08-0.15
9450	0.45-0.55	1.20-1.50	0.040	0.050	0.40-0.60	0.20-0.40	0.20-0.40	0.08-0.15
9540	0.35-0.45	1.20-1.50	0.040	0.050	0.40-0.60	0.40-0.60	0.40-0.60	0.15-0.25
9545	0.40-0.50	1.20-1.50	0.040	0.050	0.40-0.60	0.40-0.60	0.40-0.60	0.15-0.25

Manganese-Silicon-Chromium Steels

W.D. Steel No.	Carbon Range Per Cent	Manganese Range Per Cent	Phosphorus Maximum Per Cent	Sulphur Maximum Per Cent	Silicon Range Per Cent	Chromium Range Per Cent
9640	0.35-0.45	1.20-1.50	0.040	0.050	0.40-0.60	0.40-0.60
9645	0.40-0.50	1.30-1.60	0.040	0.050	0.40-0.60	0.40-0.60
9650	0.45-0.55	1.30-1.60	0.040	0.050	0.40-0.60	0.40-0.60

(1) When electric furnace steel is specified, the maximum phosphorus shall be 0.025 per cent and the maximum sulphur shall be 0.030 per cent.

(2) Silicon range of these WD basic open-hearth alloy steels shall be 0.020-0.35 per cent. For electric and acid open-hearth alloy steels, the silicon content shall be 0.15 per cent minimum.

IMPORTANT—These specifications are included for advisory purposes only and should not be used for procurement or inspection.

briquetting

. . . . is found important aid in salvaging operations

By A. W. WOOD
Supervisor
Metal Inspection & Process Control
Westinghouse Electric & Mfg. Co.
East Springfield, Mass.

FOR MORE efficient salvaging of the plant's 10,000,000 pounds of scrap metal each year, cast iron chips and steel turnings that were previously disposed of in bulk are now pressed into metal briquettes at the Westinghouse East Springfield, Mass., plant.

The installation consists of a crusher for reducing the size of the steel turnings, a blower system which takes the crushed material and carries it into an overhead hopper, a hydraulic briquetting machine, and a conveyor for removal of the briquettes. The capacity of approximately one ton per hour of finished briquettes is matched to the flow of scrap coming to the salvage department from the machining sections. Approximately 1000 of the 2-pound metal bricks can be produced hourly.

The briquettes are principally used by the plant's foundry as raw material, replacing both pig iron and scrap steel. Because of the scarcity of such materials, the additional supply in the form of briquettes is a considerable help in the production of castings for war products. With careful segregation of the steel scrap at its source, control in the foundry is simplified as compared with former practice of using scrap steel of more or less unknown analysis.

The steel turnings are kept separate from the cast iron chips for reason of proper disposition of the briquettes. The cast iron by-passes the crusher since it comes from the machines in suitable size to briquette. The steel turnings are passed through the crusher to produce

Steel turnings start on the return trip to the war production line as this Westinghouse worker shovels them down this chute into a pit where a special feeder device employs air to blast them into bin above the briquetter

Are you making the most of SPARK TESTING?

. . . to separate mixed tool steel stock

. . . to check on the steel before hardening tools

. . . to segregate tool steel scrap

You know the troubles that cases of mistaken identity in tool steels can cause in the tool room. They leave the door wide open for all kinds of grief—wrong heat treatment, resulting in ruined tools—valuable production time lost—skilled labor and critical metal wasted.

To avoid such difficulties, you will find *spark testing* a handy way to identify tool steel—whether you want to separate mixed tool steel stock, to check on the steel before hardening tools or to segregate tool steel scrap. True, spark testing doesn't give the information of a chemical analysis, but it provides a *quick check* on the identity of the steel.

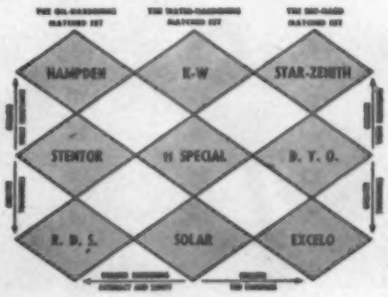
To help you develop more fully the possibilities of spark testing, we have prepared a "Guide for Spark Testing Tool Steels" in the form of a convenient 21" x 30" wall chart. It shows the characteristic sparks of the Carpenter Matched Tool Steels, including High Speed. It explains the effect that the different alloying elements have on the spark patterns. It also contains complete information on spark testing procedure—how to test most effectively, etc.

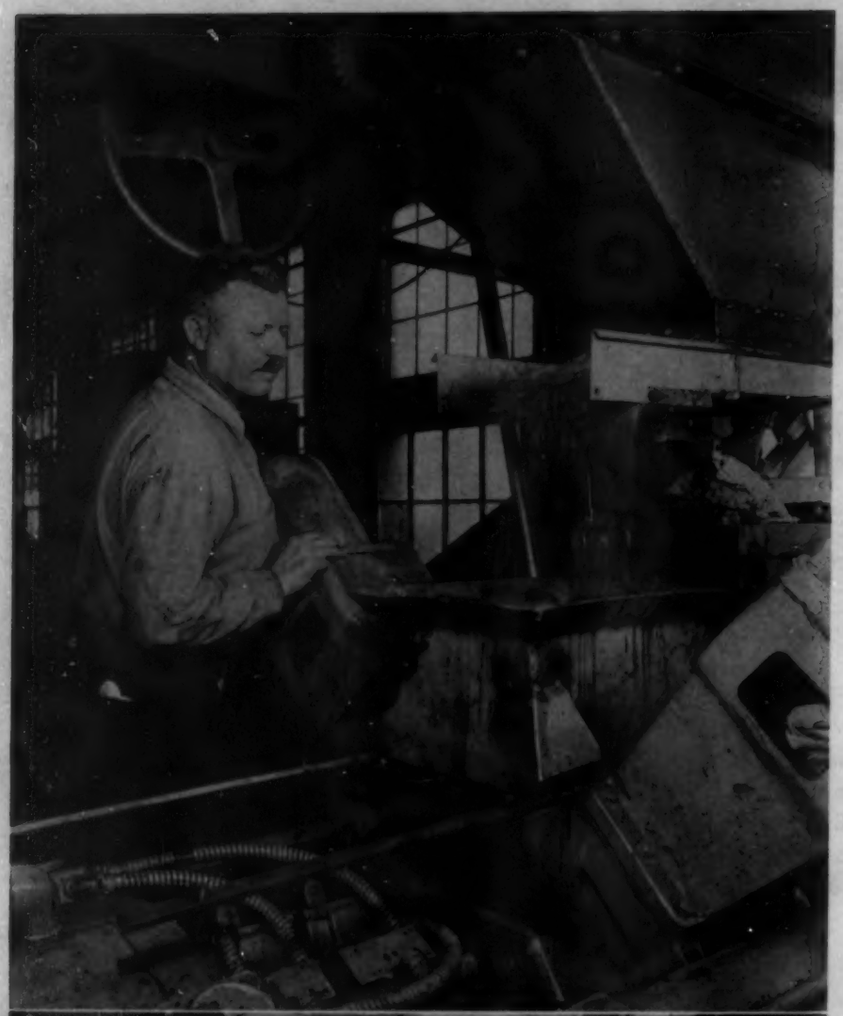
Used as a guide, this chart can help you train your men to quickly identify tool steels. It's offered free to tool steel users in the U. S. A. If you do not already have a copy, a request on your company letterhead will bring it to you.

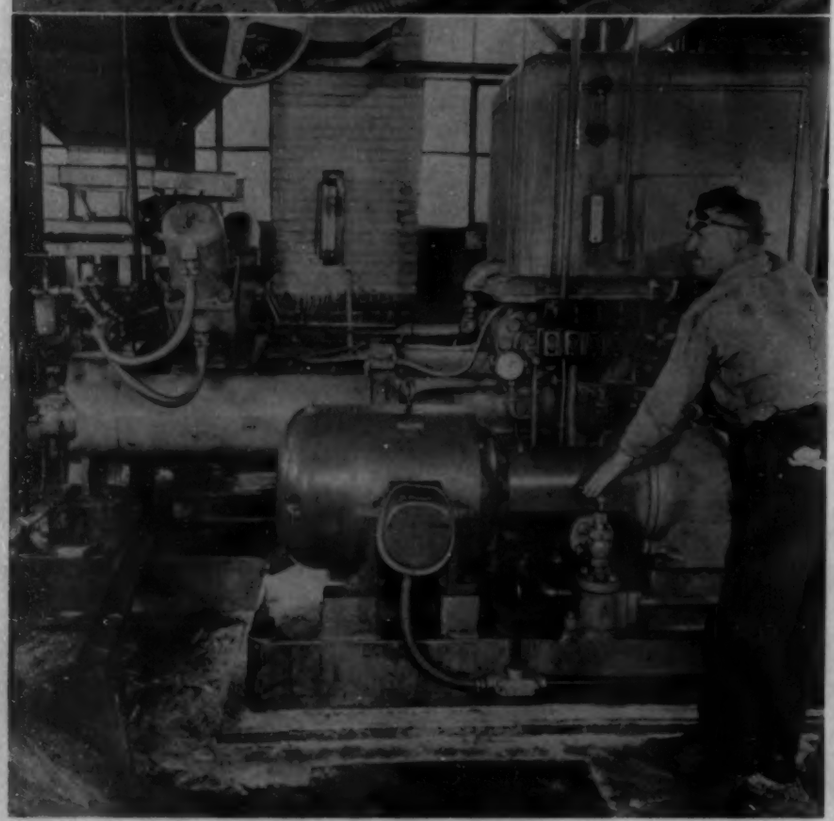
THE CARPENTER STEEL COMPANY
139 BERN STREET • READING, PENNSYLVANIA

Carpenter MATCHED TOOL STEELS

IMPORTANT BEFORE... **VITAL NOW**







Upper view — Operator charging briquetter from overhead bin. Machine will squeeze steel turnings into compact 2-pound "briquettes" which are melted down in the company's foundry and used in pouring castings for war equipment

Lower view—Overall view of briquetting machine showing operating station. Control pushbuttons are labeled "crusher", "worm feed" "blower", "conveyor", "press". Motor and hydraulic pump in foreground at right. Note chute for discharging "bricks" at left

chips of the desired form and size. A high velocity blower carries the crushed chips into a large hopper, which feeds them to the briquetting machine by a vibrating feed.

The machine itself takes the chips into a die. Then a hydraulic ram comes into the die at 2300 pounds per square inch, compressing the chips into a briquette 2¼ inches in diameter, and varying from 1 to 3½ inches in length. The rate of feed is the major factor governing the length of the briquette which is produced. At the completion of the compression stroke of the ram, the briquettes are automatically ejected from the machine into a chute, which delivers them to a conveyor system. This carries the briquettes outside of the building to a trailer for delivery to the foundry.

Steel scrap that is not suitable for use in the foundry due to alloy content is kept separate but is still briquetted for economy. Loose turnings from ordinary carbon steel and cast iron are valued at something less than $10 a ton on the present market, whereas the same material in the form of briquettes is valued at more than $18 per ton. This value naturally increases for alloy steels in proportion to the quantity and nature of the alloying elements. In addition, the cost of transportation is reduced because more tonnage can be loaded into a freight car in the form of briquettes than in the form of loose turnings.

Briquetting efficiently segregates scrap iron and steel and applies it where the most value can be obtained. This method has materially aided the establishment of a program for handling strategic scrap and keeping it properly separated for immediate and correct allocation to its most needed use. Segregation is initiated at the machine where the scrap originates, and identification by types of steels follows the scrap metal through the briquetting operation so delivered briquettes are confined to lots of similar analyses for disposition to either our foundry or an authorized scrap dealer.

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PAGES 150-153

THE SHEFFIELD CORPORATION
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By WALLACE G. IMHOFF
President
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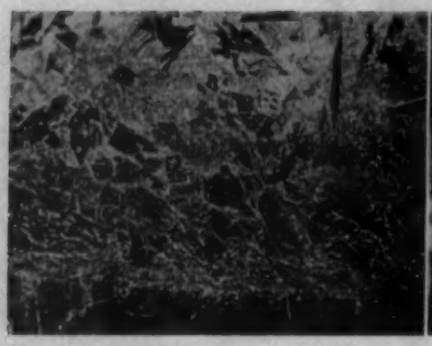

Fig. 4. (Left)—Micrograph showing disintegration of the iron surface

Fig. 5. (Center)—Here are some of the zinc-iron alloys formed at low temperatures

Fig. 6. (Right)—These zinc-iron alloys are the type formed at high temperatures

(Concluded from Jan. 25 Issue)

CONDITIONS Developed in Service: In a paper on sheet galvanizing rolls, J. A. Succop (17) states the following conditions are developed in service on exit rolls, regardless of type of steel or its heat treatment: Warpage, longitudinal cracks, transverse cracks following the grooves or elsewhere on the body of the roll, pitting on the surface, mottling—a spiral "wallpaper" design—and scaling on the roll.

Temperature Effect on the Rolls: There is a definite relation between the temperature of the galvanizing bath in which the rolls operate and the violence of the attack of the molten zinc upon the rolls. This action of the molten zinc may be divided into two main phases: First, the attack on the iron surface of a new roll; second, the penetration and further attack of the molten zinc through and below the zinc-iron alloys first formed.

The graph shown in Fig. 7 clearly illustrates this action of molten zinc upon iron. Up to 860 degrees Fahr., the action is not perceptible. At this point, however, the action becomes distinctly noticeable to an experienced galvanizer and increases in its intensity at an extremely moderate rate up to 900 degrees Fahr. From 900 to 950 degrees Fahr. the action becomes increasingly violent. Then for some reason or other, the intensity falls off as the temperature rises to 1000 degrees Fahr. This decrease in attack is quite drastic between 950 and 1000 degrees Fahr. The rate of attack then slows down and remains almost the same in intensity from 1000 to 1100 degrees Fahr., after which the action increases rapidly and continues at a drastic rate until the iron is completely dissolved.

How Alloying Action Affects Roll Condition: The alloying action of the molten zinc upon the roll is a vital factor in determining service obtained from the roll. It can readily be appreciated that in order to apply the molten zinc smoothly and uniformly as galvanized coating the surface of the roll must be "wet" properly. There must be no breaks or bare patches without zinc, the metal must flow easily and uniformly, and the supply to and from the surface and onto the sheet must be even and must be clear, clean metal.

All these conditions can only be met by a roll surface such as zinc-iron alloy. Any other kind of a material or surface condition will not "wet" the roll surface properly. Thus the alloying action of the molten zinc is an absolute necessity for proper performance of these rolls, yet if these alloying conditions are not right then much trouble can result.

Transverse cracking of the exit roll is a serious cause of roll failure. To explain what happens it is necessary to discuss briefly two or three other conditions besides the galvanizing bath temperature. The bath temperature may register from 830 to 880 degrees Fahr. or possibly much higher. A good galvanizing pot will generally show a difference of about 30 degrees Fahr. between the metal temperature at top and bottom of the pot; a 50-degree difference is an average that might be expected in almost any galvanizing pot. Yet some cases have been found with a temperature difference of 100 to 150 degrees Fahr. In one extreme instance, the top temperature was 850 degrees Fahr., while the bottom was over 1300 degrees Fahr.

One reason for the difference in bath temperature is to be found in the accumulation at the bottom of the pot of zinc-iron alloy, commonly called "dross". R. J. Wean (10) (see bibliography at end of first section, STEEL, Jan. 25, p. 72) in analyzing this dross accumulation in the bottom of the pot and its effect on the rolls finds the iron content of the bath varies from 0.03 per cent at the top to 3.2 per cent at the bottom of the pot. Because of this high iron content, lack of metal circulation and the nature

Apostle of the *Impossible!*

He's a strange sort of genius compounded of curiosity, skilled hands and a peculiar mental twist . . . He has visions of impossible things.

One day recently, the National Inventors Council in Washington — America's clearing house for war-winning inventions — had a letter from him. It read: "Sirs: I've a couple of ideas in my head that may be of military importance. Kindly send me your bulletin so that I'll know what to do to help. Yours for Victory!"

And today, one of those ideas is helping to win the war — literally "Yours for Victory."

This is a typical story of America's Apostles of the Impossible, the inventors, the builders and the basement-bench Edisons who have submitted to the Council more than 50,000 ideas and inventions in less than 24 months. All have been carefully examined, hundreds are today being tested, and scores are actually at work winning the war and strengthening America's production lines for the peacetime pull ahead . . . But America needs more!

We at Jones & Lamson have a fair share of "apostles." They are attracted to our kind of work. Through more than a century of our history, these men, with visions of impossible things, have helped to design and develop a formidable list of America's great inventions and many of the basic machine tools in the front line of industry today. We've learned to respect their ideas, from the simplest suggestion to the most complex design — on the assembly line and in the laboratory — and we're urging them to help the government by submitting all promising plans to the National Inventors Council.

We hope that you too are seeking out such men, and helping to mobilize their inventive genius for the protection of the country — and the company — they're working for in this emergency.

For any counsel or assistance that we can give to you or to any individuals in your company on ideas involving the use of precision machine tools, Jones & Lamson engineers and service men are at your call.

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Profit-producing Machine Tools

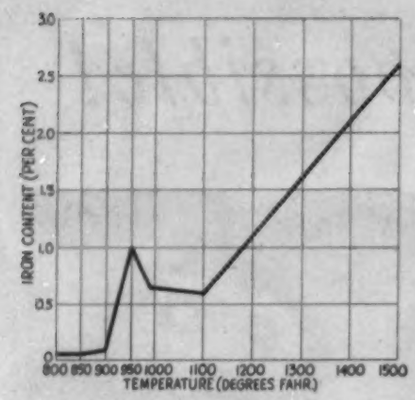

Fig. 7—This chart shows graphically the per cent of iron content in iron-zinc alloys at temperatures from 800 to 1500 degrees Fahr.

of the dross itself, heat tends to accumulate in the dross.

It has been previously mentioned that in some cases the grooves in the rolls are V-shaped. It has been suggested that a U-shaped groove might be safer. Study of roll failures indicates that the zinc-iron alloys play an important part.

For example, as long as the bath temperature is always below 860 degrees Fahr., the formation of the alloy on the roll surface is a slow process. Too, the alloy layer is thin, yet it acts as a surface covering and protection from further attack, while at the same time furnishing the ideal "wetting" surface for the roll. Attack on the roll is very mild, almost imperceptible. The metal in the grooves is thin and does not have a tendency to form a deposit in the groove and stick there. The coating action is perfect, and the metal is fluid.

But there are many things in practice that upset and destroy these ideal operating conditions. For example, as the iron concentration in the bath increases, it tends to change the character and the fluidity of the metal. Dross at a low temperature is "soft" and "slushy". There is no expanding force available. There is no tendency for it to become lodged in the grooves because the flow of good metal tends to wash it out.

With dross and zinc-iron alloys at higher temperatures, this condition does not hold. the "grit" or "sandy" zinc-iron alloy crystals lodge in the grooves, stay there and clog them up. Surface attack on the rolls is also more violent.

This condition may eventually destroy the roll itself. The destructive forces are increased iron and increase in temperature. The subject of iron-zinc alloys is a vast study in itself (18 to 30 inclusive) so only specific references as to how this alloy can destroy galvanizing rolls will be made at this time. Fig. 4 shows the formation of the zinc-iron alloy with the crystals breaking up and floating off into the zinc. The continued attack and disintegration of the crystals eventually reduces the roll size. However, a more serious condition may develop with the increase in bath temperature and the lodging of the "dry", "sandy", zinc-iron alloy that forms at higher bath temperatures.

Fig. 5 shows the character of the zinc-iron alloy that is formed at low bath temperatures. Fig. 6 shows the character of the zinc-iron alloy formed at high galvanizing-bath temperatures.

Now if we carefully study the relation of these alloys to the destruction of galvanizing rolls it can be seen that, first, at low temperatures the zinc-iron alloy actually protects the roll surface from continued drastic attack by the zinc. However, with increased temperature, two vital changes take place that immediately start deterioration of the roll. First, the increased temperature brings about a recrystallization of the zinc-iron alloy. While this is going on, the readjustment in structure seems to open up the protecting zinc-iron alloy formed at low temperatures, allowing the zinc to penetrate through to fresh iron below. In addition, the taking up of more iron into the zinc-iron alloy seems to increase greatly its expansive power.

Since the groove is already a point of weakness and all the elements of destruction are concentrated there, cracking the rolls in the grooves is almost certain to result. The cracks usually develop at the bottom of the groove. If the bottom has square corners or is V-shaped, the cracking will occur more readily than a U-shaped groove. That is why the U-groove is recommended.

Warped Rolls: Strains are set up in rolls both in fabrication and in service. No forged roll is ever perfectly round, hence in turning it down it is necessary to remove more metal where the most metal is. This uneven machining may later cause warpage if the strains are not relieved by heat treatment. Of course the correct heat treatment must be applied evenly or warping may result.

Succop (17) states that warpage of rolls is from carelessness because it is purely the result of uneven relieving of internal strains. Obviously correction of this trouble is entirely one of uniform heating and uniform cooling. He cites the following ways in which rolls become warped in the consumer's shop.

—Mechanical bending by improper removal of the roll from the machine, permitting the roll or roll neck to strike the floor while hot.

—Placing a hot roll on a cold floor without protection, instead of placing the roll on skids to permit uniform cooling. Good practice is to place the roll on skids sufficiently high from the floor to permit free circulation of air yet protect it from drafts.

—Cooling a roll in water after removal from the zinc bath is very likely to induce warpage as well as other troubles, such as cracking.

—Charging a cold roll into the hot bath or charging the machine into the bath with cold exit rolls in position. This practice is sure to produce irregular heating.

The above four conditions all indicate either a *profound lack of even elemental practical experience in handling the rolls, or else downwright carelessness by the user.* Once the rolls have been warped they must again be machined and the strains properly relieved. Strains are put in the rolls either in fabrication or by some condition of service.

Cleaning the Rolls: From the discussion already given on the drastic effect that high temperatures have on the reaction of zinc on the roll, it can be seen that when the rolls are to be cleaned by heating, the temperature should be kept well under 900 degrees Fahr. A temperature above 900 degrees Fahr. only drives zinc into the rolls and will tend to make them brittle. Zinc will not oxidize until a temperature of 1100 degrees Fahr. is reached, and this extreme heat will not only drive the zinc into the roll but quite likely will crack it.

The ideal cleaning method is more one of soaking a long time at a low temperature. While I have never seen it done and no reference is made to it in literature, it would appear desirable to use high-pressure hot air or dry steam to blow the surface and grooves clean after the metal has been thoroughly melted and softened by heating at the low temperature.

If the rolls are cleaned by pickling, the sulphuric acid should be weak, and a good inhibitor should be used. This operation may take 2 or 3 hours. The temperature of the acid bath should be low, and the roll should not be put into the bath while at a high temperature. Care, of course, should be taken to see that the roll is not overpickled.

Fluidity of the Galvanizing Bath: Both tin and cadmium are used in sheet galvanizing baths, and both tend to thin out the zinc and make it more like water —very thin and fluid. A bath in this condition can also be operated at lower temperatures than one of pure zinc. Too, pure zinc tends to produce a harder more compact zinc-iron alloy; with tin and cadmium there is a tendency for the alloy to be soft and "slushy", and the metal itself is less sticky.

High Heat Concentration at Pot Bottom: Particular care should be taken to

(*Please turn to Page* 112)

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CONVEYOR AIDS CLEANING

In a Midwestern Foundry

THOROUGH cleaning of castings weighing from 1 pound to 1 ton is obtained with a single blast-cleaning machine at the Spring City Foundry Co., Waukesha, Wis., utilizing a heavy-duty overhead chain-conveyor system. Over 95 per cent of the foundry's entire production of green castings is handled by the machine, with approximately half the total tonnage clearing through a second time to remove scale after heat treating. Cleaning capacity ranges from 4 to 6 tons an hour, depending upon the work being handled. Foundry production covers a wide range of casting shapes and sizes.

The blast cleaning equipment is a special cabinet supplied by the American Foundry Equipment Co., Mishawaka, Ind. It employs an airless abrasive blasting method using three wheels, each throwing 450 pounds of abrasive a minute by centrifugal force. Wheels travel at 2250 revolutions per minute. They are 19½ inches in diameter, and 2½ inches wide, mounted on one side of the cabinet.

The monorail conveyor, with hooks on which castings are hung indexes in front of each wheel so the work passes through the abrasive stream of each.

A sand-blast room is used for castings beyond the 1-ton capacity of the centrifugal machine, or for castings that do not lend themselves to hooking, while a tumbling barrel is employed for service on work on which a tumbled finish is specified.

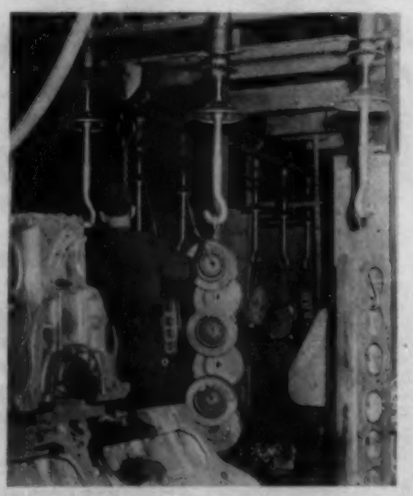
The abrasive cleaning unit is said to remove every trace of foundry sand or scale from castings put through the machine, and a "touch-up room" for manually cleaning corners or pockets of intricate castings with compressed air sandblast is unnecessary.

The machine consists of a cabinet of plate steel construction, and work to be cleaned is taken through this cabinet on a monorail conveyor. For loading and unloading, the conveyor passes parallel to two sides of the cabinet and some distance from it. Abrasive and scale drop through a grating below and are moved by a conveyor, located in a pit below floor level, to a position from which they are carried by an elevator to a separator mounted above the cabinet. The separator removes scale and fines from the abrasive before the latter is returned to the blast wheels for reuse.

The three centrifugal blast wheels

(*Please turn to Page* 114)

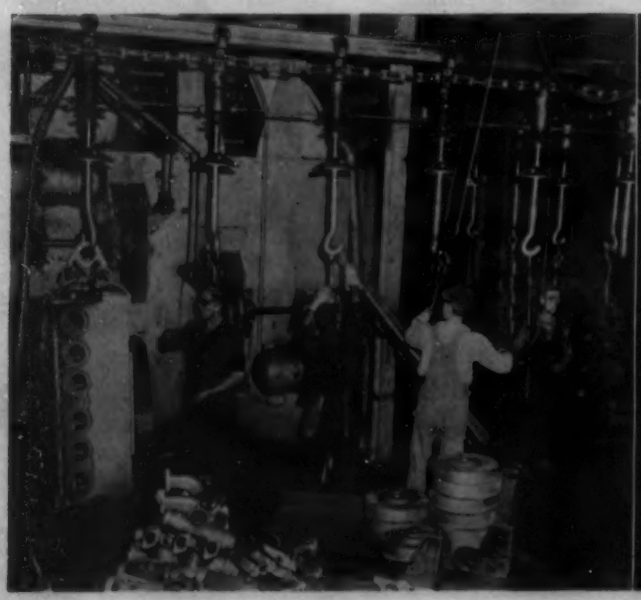
From THE FOUNDRY.



Right—View of the loading station showing conveyor chain. Castings loaded on hook in background are coming from the cleaning cabinet

Left, below—Unloading station. Here core rods are being removed from castings at extreme left while an overhead hoist removes from the conveyor the long casting shown at center

Right below—View of the abrasive cleaning unit at end of a day's cleaning operations with worker blowing abrasive from pockets of last casting cleaned. Grating around machine permits abrasive to fall into pit extending under entire machine



THE 29,161st . . . A QUITTER?

THE MONSTER STOPS, betrayed. A tiny part within quits at some crucial place. One flaw in one of 40,000 metal pieces was enough to end its fight.

Tiny but tremendous bits of metal these, since one small part, imperfect, badly made, means mangled flesh and broken bones for some kid we knew or might have known!

What can we do to set against the life he gladly gives? We can swear Metal is a sacred trust, not to be spoiled or wasted. We can pledge Workmanship, care in it, speed in it, years of past patience brought to his burning present need, there in the desert.

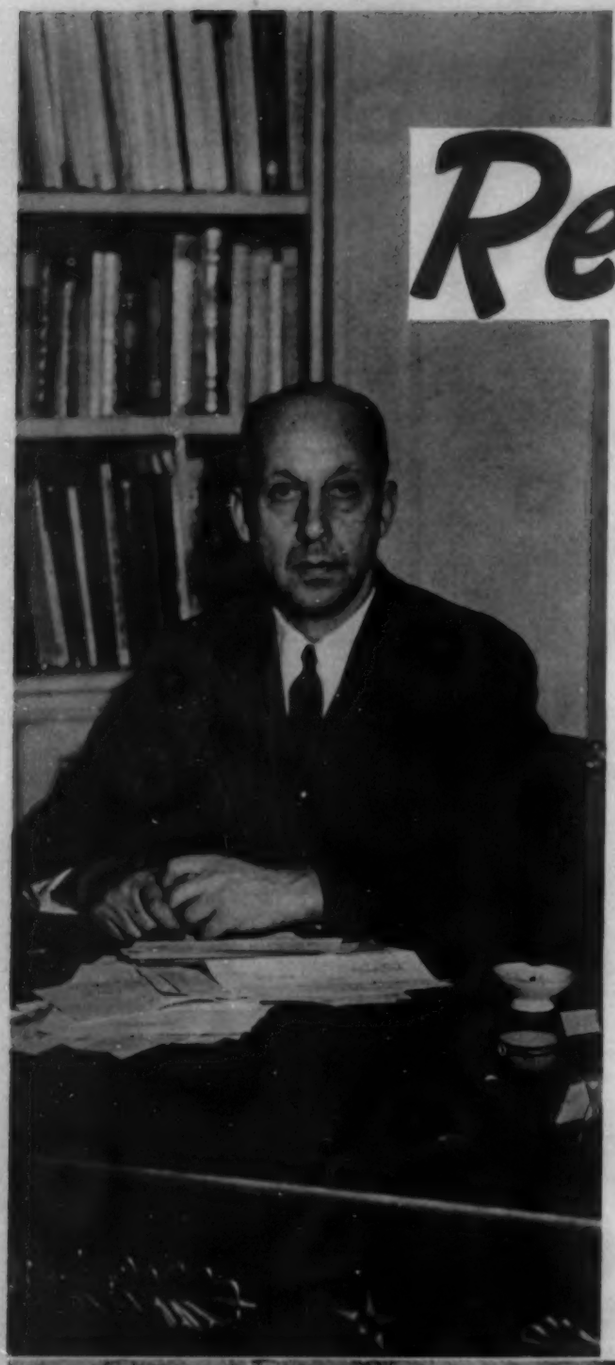
We all can make our "Okays" absolute, study and plan and sweat to make each bit and part move with precision — to the minutest fractions! — hold ourselves sternly to his battle's grim accounting.

Such is the pledge of us who manufacture Empire bolts and nuts ("tremendous trifles", indeed) that serve our nation's might. To manufacturing processes which insure maximum strength and greatest accuracy—we add the personal *energy* and *care* that will help make the most of R B & W's contribution to world Victory.

Posters for your War Production Drive, reproducing this ad but with an appropriate slogan replacing our signature, are available, *free*, upon request. Drive home to every worker the importance of war-essential "bits and parts". Write Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

RB&W *Making strong the things that make America strong*

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY



Recovering from SLAG

When Michael J. Kirwan, the congressional representative of Ohio's principal-steel-producing district, introduced a bill in Congress a few years back to admit a certain Netherlander in the United States outside the Dutch quota, the congressman confided shrewdly, if somewhat ungrammatically, to a friend:

"This guy thinks we're doing him a favor by letting him into our country. Why, that Dutchman is doing us a great favor by coming. Wait and see."

Well, his prophecy already has come true. "That Dutchman" is making a major contribution, one of the most vital contributions, to America's war production effort, because he is helping the steel mills by helping solve their scrap problems, and you will find plenty of evidences of his contribution today in any of the boom-

Fig. 1. (Left)—Eric H. Heckett who has recovered many thousand tons of scrap from old slag dumps of various steelmakers

Fig. 2. (Left, below)—Scrap recovering machine in operation at an old slag dump of American Rolling Mill Co., Butler, Pa.

Fig. 3. (Below)—Rear end of skull cracker. Broken scrap is hoisted by magnet and delivered by crane to hopper cars at front end of runway

Fig. 4. (Opposite page)—Front end of skull cracker. Structural material formerly was a part of the dismantled Third avenue railroad, New York

By GEORGE R. REISS
Youngstown, O.

Scrap DUMPS

ing steel mill towns—Butler, Chicago, Granite City, Gadsden, Canton, Youngstown, Pittsburgh, Coatesville, etc.—which are making war steel. You will find those evidences at those steel towns' slag dumps.

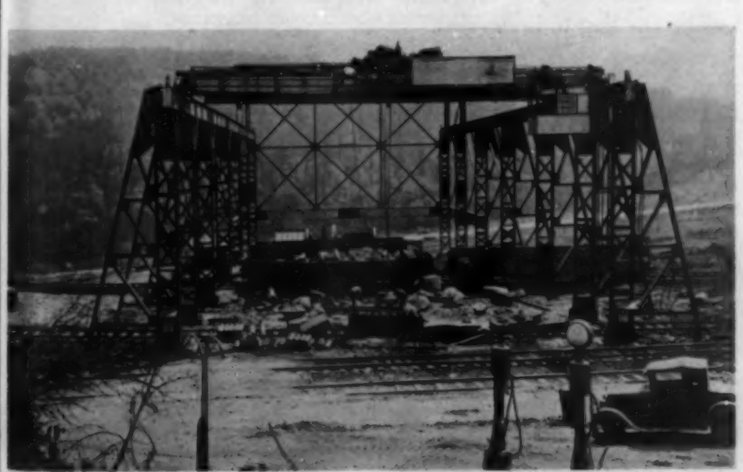
For, with typical Dutch frugalness and hatred of waste, he is gleaning each month from those slag dumps, some of them previously undisturbed for many generations, 16,000 to 20,000 tons of high-quality steel scrap.

"That Dutchman," Eric H. Heckett, is president of the Heckett Corp., and Heckett Engineering, Inc., Butler, Pa., which are building a chain of scrap reclamation plants in these steel towns to recover that vast quantity of valuable iron and steel that the mills for decades buried in their refuse heaps.

But Heckett's idea makes it practical to gather in this wasted steel—and handsomely profitable, too.

Some years ago, this Heckett was a top-flight executive of a Dutch firm which did a Europe-wide business. His work often took him into the European steel mills which were important customers of his firm.

He was fascinated by the spectacular processes of the steel plants and their big operations, yet appalled by them, too. For he became conscious of their tremendous waste of natural resources, by the discarding of large quantities of good metal—those tiny droplets of steel which spattered into the sand and cinders around the furnaces; those larger chunks which adhered to the slag, and the "skulls," those big pieces of mixed slag and steel which harden in the bottoms of the ladles or other vessels and then were being dumped on the refuse piles.



One day, while visiting a model European mill, Heckett pointed out the wasted steel to an executive, shook his head sadly, and observed:

"It's too bad to waste steel that way. Some day we'll run short of iron ore and coal and limestone and other resources. . . ."

The executive laughed:

"We're in business to make money, and we couldn't make money if we paid out all our profits in gathering up the metal. Now if you could show us a profitable way to recover it. . . ."

"Maybe I will," replied Heckett, accepting the dare. And, intrigued with the problem, he began studying what existed in the way of equipment that could be used, experimenting in his spare time—and found the solution of the problem. He found that some recovery machinery already existed, and in combining existing machinery and his new ideas he arrived at a solution that proved practical and profitable, and European steel men, always waste conscious because they worked constantly on narrow margins with poor grades of ore, were interested, enthusiastic, eager to try it. So he built a chain of 20 steel recovery plants on the principal European mills, working both their old slag dumps and their current slag output.

His idea was highly successful—so successful and important that many European companies permitted his Dutch company to operate in them without the restrictions of blocked currency regulations. By 1938, most European mills had such scrap recovery plants.

With his business firmly established, Heckett and his family came to the United States in 1938 on a combined vacation-business trip. Naturally, he was drawn to the American steel plants—and found their waste even more appalling.

There was no scrap shortage here, the United States had vast iron ore ranges containing mineral much richer than the best European mills had to work with, coal was plentiful, and so was limestone. So American steel executives were not too much concerned about the waste that was carried out with the slag. However, some American steel plants did operate slag docks and "skull crackers," equipment that broke up the big chunks of open-hearth slag and steel to extract the remaining steel, but wasted much of the smaller pieces.

Only a few years back, the mills were throwing away 4 per cent of their entire output of steel with the slag; but if now, under more modern methods, only 2 per cent is lost, then on this basis, 1,500,000 to 1,750,000 tons of steel that could be worked into guns, tanks, ships, etc., will be buried this year with the mill refuse.

At first, American steel executives with whom Heckett talked about his scrap recovery idea were apathetic, even laughed at him.

"It's cheaper," they told him, "to forget about the steel that stays with the slag. We can't use up all the scrap we've already got—so why worry about a little waste?"

Steel scrap was cheap, so cheap, in fact, that the steel mills could afford to use only the best quality, and to ship inferior grades to Japan and Europe. So, too, Heckett got no enthusiastic attention from the steel executives.

In fact, he was stumped in his efforts to induce any

Fig. 5—Tumbling barrel which cleans recovered metal

steel executives to try his idea at all. He found there were no American patents covering such scrap recovery devices, although some American companies used similar ideas to pick out nails, nuts and bolts and other metals considered impurities from grain or coal; and some foundries used a similar idea to clean their molding sand. So he had no difficulty in patenting his method of recovering and preparing steel scrap from the steelmaking furnace slag and refuse.

As his stay in the United States, while he sought vainly to interest steel men, lengthened into weeks and months, his visa ran out. But Heckett was still hopeful of success, and was eager to try his ideas here. He sought permission to enter as an immigrant under the Netherlands quota—but found it was filled for years to come. So it appeared that the Dutch inventor must leave with his idea.

Congressman Kirwan, Youngstown, O., home of some of America's largest steel plants heard of Heckett and his plight. Himself a former steel worker, the representative was convinced Heckett was on the right track; so he introduced his bill to admit Heckett outside the quota, the first time that was ever done, and the bill was enacted into law. So Heckett found himself free to go ahead with his work, unhampered by immigration authorities.

And finally—success. But small success. He finally induced Republic Steel Corp., second largest of the so-called "independents," to try it, building a recovery plant on the open-hearth slag dumps of their Chicago district plants.

He organized his company, the Heckett Engineering Co. It was a success—and Republic signed a longer-term contract for working an existing dump at its Gadsden, Ala. plant. Came the war, and on its heels, the unprecedented demands for steel, then the scrap shortage. Steel executives found they no longer could be choosey about scrap supplies, accepting even the lower grades, then even grades that could not be considered at all at other times. Some mills even found themselves forced to curtail operations last winter for lack of scrap. And, struggling to get together more materials to supply their hungry open hearths, the steel executives suddenly remembered Heckett; and they took a sudden deep interest in him and his idea.

So did the Defense Plant Corp., a subsidiary of the federal government-owned Reconstruction Finance Corp., which concerned itself with trying to boost American war production and trying to solve shortage problems which was crippling American steel output. With its finance help, he organized Heckett Corp., to build and operate scrap reclamation plants for it, combing over piles of mill refuse which had been untouched for a half century.

Currently, his two companies are operating about a dozen slag recovery operations, gather in 16,000 to 20,000 tons of metal, worth $19 or $20 a ton at current fixed scrap prices, each month, which he delivers to the steel industry at about one-half this price, and are building many more plants under high priority ratings which will boost this output considerably.

Among those American concerns for which his two companies are building or operating such plants are Republic Steel Corp., at its Canton, O., Chicago, and Gadsden, Ala. plants; American Rolling Mill Co., at Butler, Pa. and Middletown, O.; Lukens Steel Co., Coatesville, Pa.; Phoenix Iron Co., Phoenixville, Pa.; Granite City Steel Co., Granite City, Ill.; and Andrew Steel Co., Newport, Ky.

Huge power shovels burrow into the old slag piles, combing out ladle "skull" and large chunks of tap hole drippings, which are broken up at "skull crackers" by 5-ton steel balls dropped from great heights, or by dynamiting them.

Smaller pieces are loaded into a separating machine equipped with a conveyor which takes the slag over a magnetized drum. Slag without steel simply rolls off the drum, which revolves, but any particles of steel cling to the drum until it makes a partial revolution; then it is demagnetized, and the material falls into some shaker bins.

The larger chunks are carried off, but the spittings which fly out at the time the furnace is tapped go on through. These "fines" are sold to blast furnaces for mixing with iron ore—for the material is richer in iron than new ore.

The larger chunks are put into a large tumbling barrel, holding from 6 to 8 tons. The tumbler whirls the steel and slag until the steel, as clean and shiny as freshly worked new steel, is lifted out with electric magnets, leaving the slag to be wasted.

At present, operations of Heckett's companies are confined chiefly to steel furnace slag dumps containing from 12 to 18 per cent of recoverable steel scrap and yielding 2000 to 3000 tons of prepared scrap monthly each.

However, he feels that there is no reason why, if the scrap shortage continues, recovery operations cannot be started on dumps with even lower percentages of steel, provided either the federal government or the steelmakers are willing to pay the cost of recovery.

He estimates at present the cost of recovering and preparing scrap from these dumps ranges from $6 to $9 a gross ton—and it is worth at present government-fixed market prices $19 or $20 a ton—and in dumps containing as low as 6 per cent of recoverable steel, the cost might rise above $20 a gross ton.

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Crane Co., 836 South Michigan Ave., Chicago, Illinois

"Piping Pointers" Bulletins—one of Crane Co.'s wartime aids to industry for getting better and longer service from valves. Supplied free on request.

CRANE VALVES

By C. R. SCHRODER
Research Metallurgist
Great Lakes Steel Corp.
Detroit

SPOT WELDING Thin High-Tensile Steel

. . . . now done successfully by adding a subsequent heat-treating current application to the welding cycle

HIGH TENSILE and deep-hardening steels are generally regarded as very difficult to spot weld in comparatively thin gages by the ordinary methods of single and multiple pulse welding as used for plain low-carbon steels. The difficulty arises from the fact that the cooling rate of spot welds made on thin gages is of such magnitude as to result in an extremely hard and brittle weld structure for steels of considerable hardenability. This brittle structure, like all brittle metallic structures, exhibits a high resistance to shear stresses but is very low in resistance to normal stresses, and hence these welds break apart very easily when subjected to stresses normal to the welded surface.

It was found that this brittle weld structure was obtained when the welding heat was developed in a single pulse or when the welding heat was developed as a result of a series of successive pulses, which is commonly known as pulsation welding. This was as expected since in the case of thin gages, even though the welding heat be developed by more than one pulse, the cooling rate from the molten state would be high enough to result in a very brittle structure.

In the course of this investigation a very successful method was found for spot welding the N-A-X high-tensile steel used in this work, and it is reasonable to suppose that this method, with necessary but minor adjustments for steel chemistry, thickness and hardening characteristics, can be applied to other steels of medium and even high hardenability.

Briefly, the method consists of making the weld in a single pulse of as few cycles as necessary to result in a spot diameter consistent with electrode diameter, allowing a very critical and definite time off in which the weld cools quickly to form a brittle transformation product, and then drawing or tempering this brittle structure to one of far greater toughness and ductility by means of a second pulse, which we have termed a heat-treating pulse. This heat-treating pulse consists of as few cycles as are necessary to obtain the desired result with a current magnitude which is usually considerably less than that required in the actual welding pulse.

The total time required for the weld, time-off and heat treatment is about 25 cycles (5/12-second) for 0.040-inch material and about 50 cycles (5/6-second) for 0.070-inch material. The entire cycle of weld, time-off and heat treatment can be made in one contact of the electrodes with one setting of the electronic control equipment.

Welds made by this method in the high-tensile steel used in this investigation resulted in weld structures which were much softer, more ductile and of far greater toughness than the weld structures obtained in previous methods used for spot welding these thin gages of deep-hardening steels. It was found that by using this method, the actual ratio of U-strength to shear strength for a spot weld in this material could be more than doubled as compared with that ratio for welds made by ordinary methods without a post heat-treatment cycle. This ratio of U-strength to shear strength may be considered as an accurate indication of the toughness or ductility of a spot-weld structure since it is a measurement of the ratio of the resistance to normal to the resistance to shear stresses. When this ratio is high, which means the structure has a high ratio of normal strength to shear strength, it is a good indication that the structure is tough and ductile.

Thus it seems that, even with the slight increase in time required by using this method, if the ratio of U-strength to shear strength can be increased from within the range of 20 to 30 per cent to within the range of 50 to 60 per cent, the method is certainly practical. For plain low-carbon steels welded by ordinary methods this ratio is usually in the range of 50 to 70 per cent, and if methods can be used for high-tensile and deep-hardening steels, which methods will result in ratios which are nearly as high as those of the plain low-carbon steels, then the advantages are clearly evident. The actual shear and U-strength values for the high-tensile and deep-hardening steels are much higher than those obtained for plain low-carbon steels.

The method developed and used in this work has resulted in weld structures of sufficient combined strength and ductility or toughness to compare favorably with the properties of the parent metal in which the welds are made.

It is also recognized that most of the extra time required by this method can be saved again by improved methods of material handling in production welding operations.

Material and Equipment: The N-A-X high-tensile steel used in this work, and for which this spot-welding method has been developed, has the following analysis:

Carbon	0.14
Manganese	0.65
Phosphorus	0.017
Sulphur	0.021
Silicon	0.84
Chromium	0.57
Molybdenum	nil
Zirconium	0.11

This steel is one of a series of N-A-X high-tensile steels, and its physical properties in sheet form are as follows:

	Annealed	Half-Hard
Tensile strength, psi.	70,000	98,000
Yield point, psi.	50,000	90,000
Per cent elongation, 2 in.	28	.....

This investigation included work on two thicknesses of the above material in both the annealed and half-hard tem-

(*Please turn to Page* 115)

Presented at the annual meeting, American Welding Society, Cleveland, Oct. 12-15, 1942.

FOR WAR TODAY—FOR YOUR PRODUCTS TOMORROW

ZINC ALLOY DIE CASTINGS RESIST SUDDEN SHOCK

A shock absorber goes to war

Every time a "jeep" bounces down on its axles, zinc alloy die castings are undergoing a complex impact and compression test—from which they emerge with flying colors. The load-carrying parts of "jeep" shock absorbers (see illustration) are die cast of zinc alloy.

This use of die castings is not new. The same type of absorbers have been used on passenger cars for years. As a matter of fact, it is the pre-war service record of these absorbers which has resulted in their adoption for "jeeps." The entire recoil shock of the absorber is transmitted through 2 of the 3 zinc alloy die cast parts.

In one issue of "The Alloy Pot" considerable space was devoted to a discussion of the strength characteristics of zinc alloy die castings. A copy of this issue will be sent to you promptly upon receipt of a request on your Company letterhead.

A WEAPON FOR CLOSE QUARTER FIGHTING

Reports from Guadalcanal tell us that the elusive Jap appears from nowhere to face the advancing marine in the jungle. Such an experience is one that most of us at home can only dimly imagine, but it is reassuring to know that our marines are equipped with the efficient fighting tool shown below to cope with such a situation.

There is nothing remarkable about the construction of this stiletto, but it has been carefully designed from three standpoints. (1) The blade is of finest grade steel to avoid breakage. (2) The zinc alloy die cast handle has a knurled surface to guarantee sure grip. (3) The blade is inserted deeply into the handle in the die casting operation to achieve permanent assembly of the two parts.

Go to it, Marine—they asked for it!

The steel blade is cast as an insert in the handle

THE New Jersey zinc ALLOY POT

A publication issued for many years by The New Jersey Zinc Company to report on trends and accomplishments in the field of die castings. Title Reg. U. S. Pat. Off.

STEEL MAGAZINE EDITION **No. 6**

ECONOMY DOES NOT ALWAYS RULE

Cost is not always the determining factor in product design. Although low cost and die casting are synonymous, many zinc alloy die castings are chosen primarily for other inherent qualities.

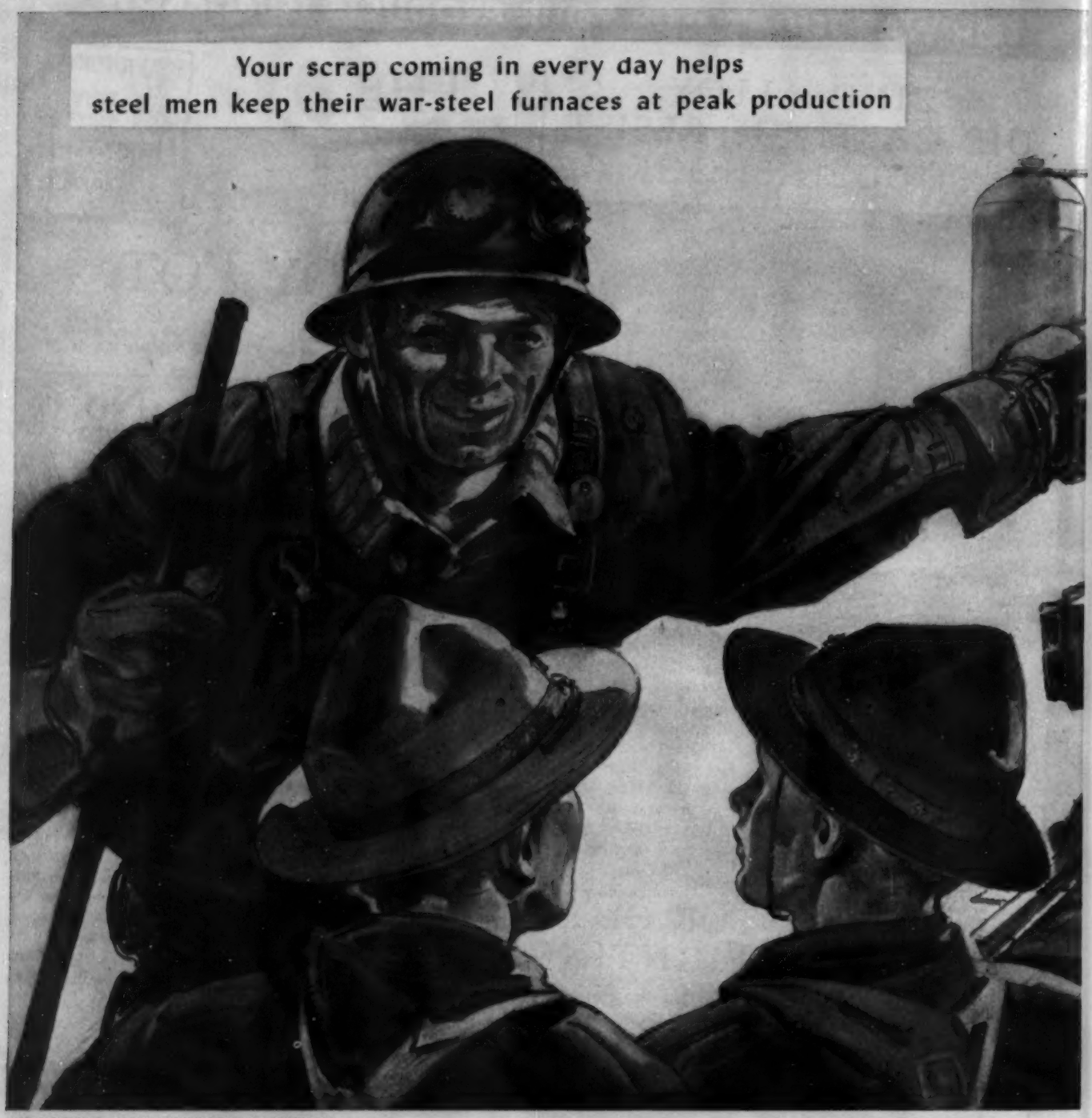
Consider, for example, the reflector in the Signal Corps flashlight shown below. Although a reflector could probably be produced as economically by some other means, this reflector is die cast of zinc alloy to gain certain specific properties. The principal requirement here is rigidity—to assure retention of the true parabolic curve of the reflector during finishing operations, as well as in subsequent use. As a zinc alloy die casting, rigidity is obtained in the bowl of the reflector, and its solid screw base is integrally cast.

The elbow head of the flashlight is also die cast of zinc alloy. This one-piece construction avoided expensive forming and assembling operations.

A rigid reflector and a low-cost elbow head

THE NEW JERSEY ZINC COMPANY 160 FRONT ST. NEW YORK CITY

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC



COPYRIGHT 1943—JONES & LAUGHLIN STEEL CORPORATION

675,000 STEEL INDUSTRY WORKERS SALUTE

The splendid results achieved by the public in the scrap-metal drives are being manifested 24 hours a day, seven days a week, in the production of more and more fighting steel by America's army of steel workers.

However, need goes on for more scrap to keep war-steel furnaces up to full production. The metal in community salvage piles is being steadily hauled away and prepared by dealers for use in the steel works. Your local scrap heaps are reservoirs that must be kept filled and scrap collections should go on, month

FROM AN ORIGINAL DRAWING BY ORSON MACPHERSON

130 MILLION AMERICANS

after month. The neighborhood scrap piles should not be regarded as unsightly, but as something in which you may take pride as symbols of America's fighting spirit.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH, PENNSYLVANIA

CONTROLLED QUALITY STEEL FOR WAR

J&L STEEL

SCRAP FOR WAR STEEL

Open-hearth stockyard in steel mill (illustrated at left) is where your iron and steel scrap, conditioned by scrap dealers and purchased from them by the carload, is received in the steel works and inspected by experts before being charged into the furnaces. Here in the millyard the boss is showing some youngsters how the scrap they collected and sold to dealers is picked up by an electric magnet and deposited into metal charging boxes on a low-built charging car. The car will convey the boxes to the open-hearth floor. Here a charging machine will pick them up one at a time and dump their scrap contents deep into the fiery bath of the steel furnace, to become fighting steel for American and Allied fighting men to win to victory.

Scrap dealers' big job comes after you and your friends have collected your scrap and deposited it on the neighborhood scrap pile. To this come the scrap dealers, 6,500 of them. They haul the material to the scrap yards, big and little. Here it is carefully assorted, so that nothing that is deleterious to finest quality war steel shall get by. Then it is graded into about 75 classifications according to intended use. Big alligator shears chop up some of it. Larger pieces are flame-cut to furnace sizes. A lot of it is squeezed by giant presses into bundles. Many millions of dollars of equipment especially for preparation of scrap is used by American scrap yards. It is a big business, a very big and important business, for it locates, purchases, transports, stores, sorts, prepares and ships to the steel plants nearly one-half the material that goes into this country's production of war-steel.

OCD and scrap collection. "The organized and well-directed scrap collection drives put on last Fall by the fire and air-raid wardens and their staffs, and later by the volunteer firemen in many localities has been most helpful to the steel industry," said H. E. Lewis, President of Jones & Laughlin. "Without their well-directed campaigns many steel furnaces would have dropped out of production for intervals, instead of working on as they did to produce 86,200,000 tons of steel during 1942, an all-time high for the whole industry. This year still higher goals have been set and even more intense searching for scrap will go on."

Aliquippa wins award. The highly prized Army-Navy award for excellence in production of steel for war was presented to the several thousands of men and women of Aliquippa Works of Jones & Laughlin Steel Corporation on January 6, 1943. In presenting the "E" flag, Lieut. Colonel John S. Swauger, executive officer, Pittsburgh Ordnance district, said: "Only untiring and unselfish teamwork, with both labor *and* management putting their shoulders to the wheel, could have won this award."

TOUGHENS "SKIN" of Ordnance Parts

ELECTRICAL induction heating of creatitng a hard wear resisting "skin" on steel to toughen up war implements is growing rapidly. The process is being applied to an ever-widening variety of parts and is expediting many machine shop operations, according to engineers of the Tocco Division of Ohio Crankshaft Co., Cleveland, makers of Tocco induction hardening equipment.

Probably no piece of war machinery takes worse punishment than the final drive gear on a tank. In order that the gear may stand up under punishment, the teeth and the region just below them must be hardened to resist wear. The remainder of the gear must stay ductile to prevent its fracturing. Such a gear has a decided advantage over one hardened over its entire area.

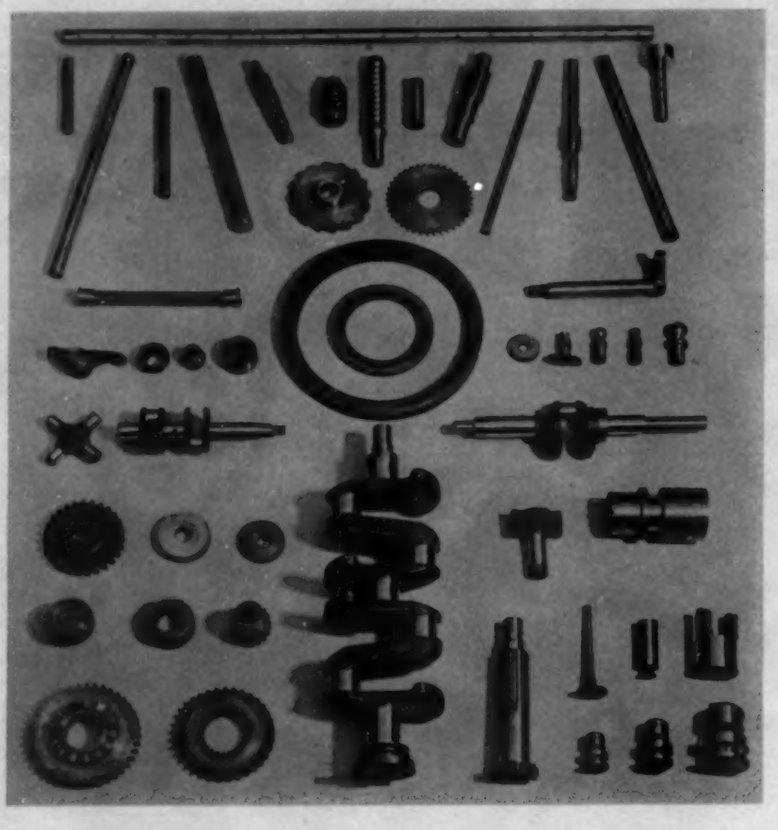
One method of creating this ideal structure is the Tocco process. The tank drive gear, 28 inches in diameter and 5 inches thick, is placed inside an inductor coil installed on one of the Tocco machines.

The operator of the machine presses a button, a high frequency electric current passes through the coil, and the gear is heated to the proper temperature. After a predetermined interval, a stream of water automatically quenches the heated metal, thus creating the hardened surface.

The rapidity of the operation and the confinement of the heat to the teeth and the zone just below them, cut distortion of the gear to the lowest minimum. This eliminates the necessity of machining after heat treatment.

Surface hardening machine parts of many intricate shapes has been worked out in the laboratories of the Tocco Division of the Ohio Crankshaft Co., Cleveland. The process has had wide and varied applications since it was first developed for hardening the bearing surfaces of automotive crankshafts.

Typical of the many varied small parts being hardened inductively are those shown in the accompanying illustration.



A group of representative small parts for military equipment—all hardened inductively by the Tocco process. Tocco photo

Denison Engineering Presents Pictorial Book on Facilities

Under the title, "Production for Victory," Denison Engineering Co., Columbus, O., recently presented in book form an unusual exposition of its plant facilities, personnel and wide variety of products having to do with the war effort.

This 36-page book, which features a number of striking full-page illustrations in full color, depicts the numerous things involved in the design and manufacture of hydraulic equipment and in various testing and production machines embodying this apparatus.

From its original applications in the ceramic industry, dating back to 1925, this company's hydraulic equipment now ranges all the way from small pumps and valves to powerful presses and other production machines weighing many tons. All of this equipment in one way or another is vital in manufacturing or testing in connection with the war program, hence the company swung its plants completely into the war effort without having to go through the process generally known as "conversion."

Copies of this book are available to executives of companies interested in hydraulic systems and machines. Requests should be made on company letter head, giving official title.

Substitutes Plastic in New Respirator

Substitution of plastic for aluminum in the construction of its Dustfoe respirator is reported by Mine Safety Appliances Co., Pittsburgh.

The plastic unit which was approved by United States Bureau of Mines, will be known as the Clear-Vue model. Its transparent construction is said to facilitate inspection of the filter without removal. Self-adjusting facepiece features a new form-molded sponge rubber face cushion and an Army-type exhalation valve provides immediate drainage of any condensation from the facepiece.

PHOTO BY U.S. ARMY SIGNAL CORPS

OSTUCO Seamless Tubing rough-rides with the motorcycle corps

THEY'LL have a big hand in speeding the date for Victory and Peace, these motorcycle troops, although there's still plenty of tough terrain ahead of them. But they'll take that terrain in stride, because their machines, thanks to careful engineering, are built to take it!

In many combat motorcycles, responsibility for necessary structural strength is delegated to OSTUCO at more than a dozen points . . . frame and cross tubes, spark plug wire tube, piston pins, cross tube sleeves, seat post, exhaust tube, fork tubes, tail pipe assembly, heater tubes and other vital parts. OSTUCO seamless tubing supplied for these purposes meets strict U. S. military standards. It fulfills requirements for close tolerances, ductility and machinability.

OSTUCO experience gained from manufacture of seamless tubing for this and many new wartime applications promises competitive advantages to its customers for realization of their peacetime production plans.

● PUT ALL YOUR SCRAP INTO THE FIGHT ● BUY U. S. WAR BONDS

THE OHIO SEAMLESS TUBE COMPANY

SHELBY OSTUCO OHIO

INDUSTRIAL EQUIPMENT

Transfer Car

Whiting Corp., Harvey Ill., announces a new type transfer car for moving annealing oven cars from loading area, to oven, to quenching tank, etc. With this car the operator, safely within an insulated steel and pyrex glass cab can, by

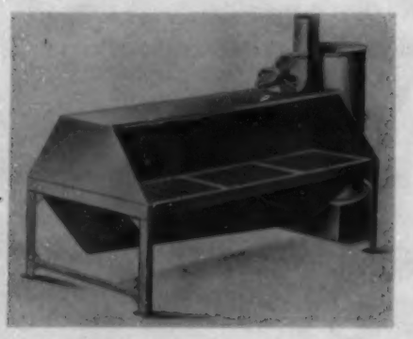
pushing a lever, withdraw the hot car from the annealing oven.

In addition to three electrical limit switches which make accidental operation impossible, the car is protected with all possible safety devices. All operating parts are readily available for maintenance. Two motors—one to rack out the annealing car and one for transverse motion—are incorporated in the development.

Dust Eliminators

Claude B. Schneible Co., Chicago, announces a new collection and recovery method for use in plants working with magnesium. It consists of a special system employing a high flash point mineral oil as the collecting medium to trap the metal in grinding, polishing and similar operations.

All metallic particles are, in a multi-wash unit, immediately coated with oil. Heavier particles are submerged in the



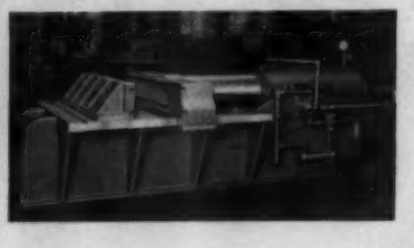
oil bath and are carried away to the settling tank; while the lighter or float dust particles are collected in the multi-wash unit for deposit in the tank.

In addition to elimination of danger from fire and explosion, another advantage is the salvaging of all metal dust. Every bit of magnesium dust is recovered. For operations on magnesium castings such as hand grinding, chipping, etc., the company offers several types of downdraft ventilating benches. These have hard-wood gratings of proper area to suit the work.

Canopies and end sheets guard against side drafts and provide maximum ventilating efficiency with a minimum of air volume. Benches are made with a V-shaped hopper at the bottom which also forms the exhaust duct. The bottom of the hopper slopes toward the exhaust outlet, and this is flushed with oil to pick up the heavier particles and carry them to the settling tank. Self-contained benches, supplied with complete collector units, are made in portable types.

Hydraulic Bulldozer

Beatty Machine & Mfg. Co., Hammond, Ind., is offering a new 200-ton hydraulic bulldozer for use in all heavy metal working industries. It is equipped with



a 60-inch table and features a 36-inch stroke.

The unit presses at the speed of 20 inches per minute. Its return speed is 60 inches per minute and its opening is 60 inches. Ram head of the machine measures 12 x 60 inches.

Testing Machine

Kold-Hold Mfg. Co., Lansing, Mich. is offering a new Hi-Low machine for testing aircraft instruments, batteries, wire, metals and various devices. It is available in three temperature ranges—from —60 to +170 degrees Fahr., from —80 to +170 degrees Fahr., and from —90 to +170 degrees Fahr.

The machine is entirely self-contained, requiring only a source of electrical power. It is 84 inches high, 53 inches deep and 94 inches long; constructed inside and out of 16-gage steel, welded and chemically treated for paint adhesion. Insulation is 8 inches of fiberglass in sides, top and bottom.

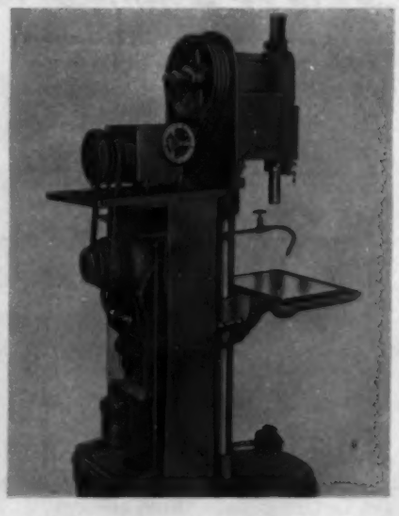
For the Hi side of the machine, strip heaters are located in the air stream for defrosting and rapid heating. For the Low side, finned type coils are used. The forced convection air distribution provides a high degree of air circulation in the working space for rapid heat transfer. Condensing unit is a 4, 7½ or 10-horsepower 2-stage, air-cooled Freon-12 or 22 machine. Temperature recording and controlling instruments are provided

to meet requirements. Interior is lighted by two 40-watt lamps, one on each side of the door and controlled from a switch on the righthand side of the door. Operating switches are at front of the cabinet. Special conduit openings, terminal panel and binding posts can be obtained as accessory equipment.

Tapping Machine

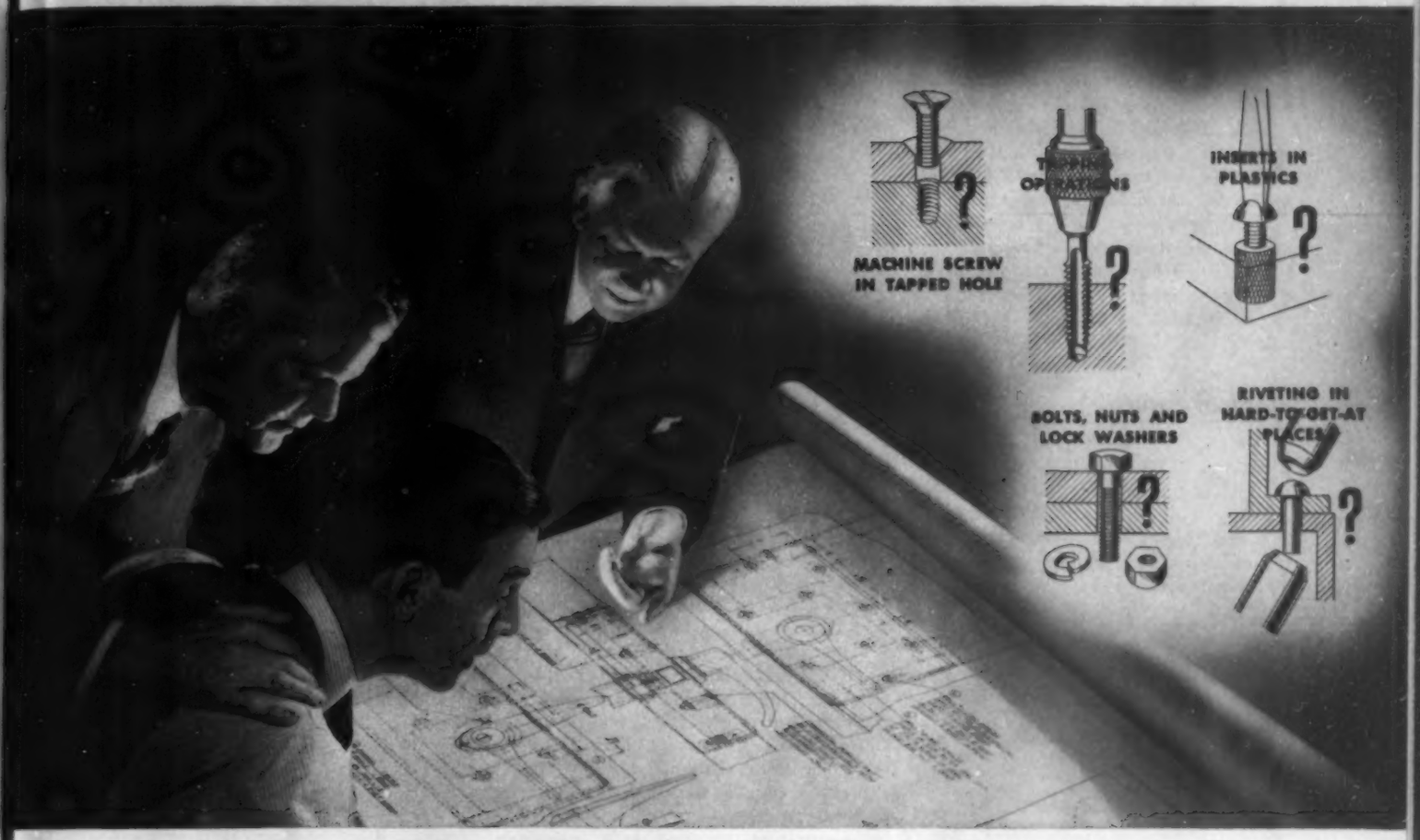
Cleveland Tapping Machine Co., Cleveland, announces the addition of a new model DB, 16-speed heavy duty lead screw tapping machine to its line. Dual push-button controlled, it has a capacity of 1¼-inch N. C. in steel and is designed for either automatic or manual operation.

The machine features a visible dial



indicator for adjusting the reverse control—so sensitive that the vertical travel of the spindle can be held to within a 0.005-inch limit. Controls are synchronized so the rotational motion of the spin-

Question every fastening job...



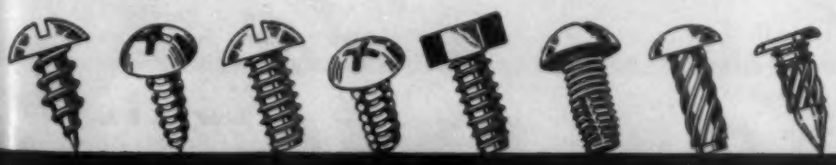
Wherever You Can Use P-K Self-tapping Screws You Can Save Time-Consuming Operations!

It has never been claimed that Parker-Kalon Self-tapping Screws offer the best means of making EVERY fastening under ALL conditions . . . BUT, it is a fact that, *for a very large percentage of metal and plastic fastening jobs, these famous screws offer a combination of ease, speed and security that no other fastening device or method can match!*

How P-K Self-tapping Screws Simplify Fastening Jobs . . .

One easy operation makes a fastening with P-K Self-tapping Screws . . . merely drive the Screws into plain untapped holes. Such simplicity eliminates tapping and tap maintenance . . . solves the problem of getting scarce taps . . . stops fumbling with bolts and nuts and placing of lock washers . . . does away with inserts in plastics . . . cuts out riveting and welding in hard-to-get-at places.

Start now . . . *question* every fastening! Be sure you can't employ the simple Self-tapping Screw method before you put up with a more difficult one.



SELF-TAPPING SCREWS FOR EVERY METAL AND PLASTIC ASSEMBLY

Call in a P-K Assembly Engineer to check over fastening jobs with you. He can show you how to search out ALL opportunities to apply P-K Self-tapping Screws. And, he'll recommend them only when they will do the job better and faster. If you prefer, mail in assembly details for recommendations.

Change to Self-tapping Screws Over Night . . .

No matter what material you're working with . . . light or heavy steel, cast iron, aluminum, brass, plastics . . . you can adopt P-K Self-tapping Screws to advantage. And you can make the change-over without interrupting production. No special tools or skilled help are required. Parker-Kalon Corp., 194-200 Varick Street, New York, N. Y.

PARKER-KALON

Quality-Controlled

SELF-TAPPING SCREWS

Give the Green Light • to War Assemblies

dle is reversed within a maximum of a quarter turn of the spindle at the moment of reversal.

Speed range is obtained through a 4-speed transmission and 4-step V-drive pulleys. The final drive of the machine is through a 4-groove sheave, into which a sensitive clutch is incorporated for tap protection. According to the company, range of speeds—45 to 300 revolutions per minute—makes the machine particularly adapted for shell work. The machine is equipped with a 3-horsepower motor, oil pump and tank and No. 4 MT spindle.

Control Switch

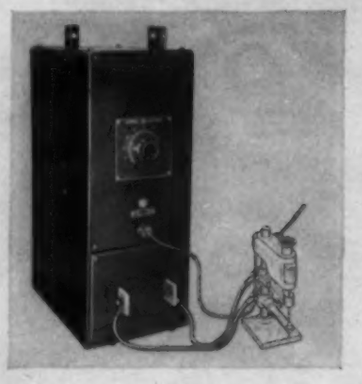
Delta-Star Electric Co., Chicago, announces a heavy-duty immersion proof control, instrument or transfer switch which is rated 20 amperes, 600 volts alternating current with 4-circuit control. It embodies locking features in the handle which permit locking in either the

normal or pushed in position. Turning handle to right or left closes a circuit; pushing in handle opens third circuit and pulling out handle opens fourth. A spring return restores normal conditions by releasing handle after operation.

Spot Welding Control

General Electric Co., Schenectady, N. Y., announces a new half-cycle electronic spot welding control for precise operation of resistance-welding machines. Mounted in a protecting cabinet, it is offered in two types: The CR7503-A136, which also includes a welding transformer and is designed for bench mounting; and the CR7503-A133, without transformer and designed for wall mounting.

Both types can be used either with tongs or with a bench welder. The control features a new tube which is easily replaced; a new circuit which makes higher-speed welding possible; and a simplified initiating circuit which improves performance and reduces maintenance. Heat control by the phase-shift method also is incorporated, the heat adjustment being made by a dial



at the front of the cabinet.

The control facilitates the welding of tinned copper, steel, or alloy wires; of studs from 0.01 to 0.05-inch diameter to flat surfaces, with little or no indentation on the opposite surface of the metal; and the spot welding of unusually thin pieces of stainless or mild steel, nickel or silver to brass or bronze, with negligible oxidation or discoloration. It also makes possible the welding of low resistance joints which are unaffected by temperatures considerably in excess of 125 Cent. This results in the complete elimination of solder, it is reported, with a corresponding saving of tin, and a saving of approximately 50 per cent in time.

Revolving Dryer

L. R. Christie Co., 17 East Forty-second street, New York, is offering a revolving, semi-direct heat dryer which

is claimed to save heat confining it so it does not contact the outer shell, except as dry gases for picking up evaporated moisture.

Material to be dried is placed between the outer shell of the dryer and the inner tube or chamber. The heat or gas is passed through a small drum or enclosed chamber which is rigidly suspended inside of and revolving with the large outer cylinder.

To provide maximum heating surface area for the material to be dried, surface of the inner casing or chamber is designed as shown in sketch. This shape allows material to contact heat for just the proper length of time.

Drying Racks

Factory Service Co., 4615 North Twenty-first street, Milwaukee, is offering a new setup for racks handling drying cores in foundries. It is shown here with two racks for drying cores mounted on a transport.

Pans containing the cores can be set

on the grid shelves and the entire unit moved into the oven. The transport is the basic unit and can be moved with practically any shop handling equipment. When the racks are not needed for drying cores they may be removed and the transport used for other purposes.

Dust Collector

Aget-Detroit Mfg. Co., 2040 Book building, Detroit, reports the availability of a new model 1250 cyclone-filter type, self-contained dust collector, which has a 1250 cubic foot per minute capacity—adequate to exhaust dust-laden air from large wheel buffers, polishers and grinders, or from small-wheel equipment when the latter are grouped. Entirely self-contained, it can be moved easily with equipment to which it is attached. It is not intended to be con-

Will Your "FORTRESS" Be Ready On Time?

Think of the months of training and practice this bomber crew put in before they were ready for the real test.

ALTER EGO: And, think of the *years* of effort engineers and shop men put into the development of the "Flying Fortress" . . . all to enable the crew to rule the airways—to navigate in a bee-line to the destination, fight off "competition" all the way, hit the target and get home safely.

Like the YEARS of preparation that'll be required to develop fortresses of knowledge before business crews can expect to rule the post-war market ways.

ALTER EGO: Right! It'll take shrewd management to steer a course of profits . . . ingenious designing to fight off tough competition . . . efficient production to hit the mark of rock-bottom costs and top quality. All of this *to survive.*

All of which is embodied in the practiced use of arc welding. There's our fortress for survival in the Battle for Business. Let's start developing our welding knowledge NOW by consulting Lincoln.

Ask your inner self if time isn't getting short for post-war planning

THE LINCOLN ELECTRIC COMPANY
CLEVELAND, OHIO

then I said to myself—

WELDED PRODUCTS HIT THE TARGET

OFFICIAL PHOTO U. S. ARMY AIR FORCES

nected in with any existing centralized system.

Installation only involves connecting a hose. Compactness permits the unit to be located immediately next to the machine, or machines, to which it is connected — usually without moving them or requiring any increase in floor space. A spun glass filter is employed so air from the cyclone receives a further and final cleaning. By returning the cleaned air to the working space,

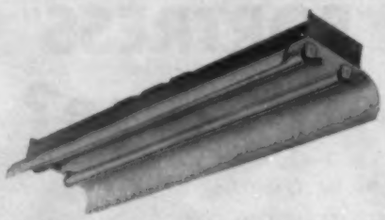
considerable heat is saved. Removal of the collected dust and dirt from the cyclone filter involves only a few moments.

The new unit employs a multiple-bladed fan direct-driven by a continuous-duty 1½-horsepower motor to pull the dust-laden air from the source and send it up to the top of the unit where it enters the cyclone. Virtually all the dust and dirt is removed from the air and deposited in a removable container. Floor space required for the unit is only about 20 x 28 inches.

Fluorescent Lamp

Spero Electric Corp., 18220 Lanken avenue, Cleveland, is introducing a new Insta-Lite fluorescent unit which provides illumination to full intensity without flicker or delay the instant the switch is turned on. In it, ballast and starting switch functions are combined, and no additional starters are required. Additional advantages are lower power loss (power factor 90 per cent or over) minimized stroboscopic effect, and lighting performance stabilized at level of maximum lumen output.

Made for two 40-watt tubes, for 110-



125 volts alternating current, the unit is offered in fixtures for industrial and commercial installations, meeting Bureau of Standard specifications, and approval of the Underwriters' Laboratory. Fixtures include nonmetallic reflector, conforming to the WPB Limitation Order L78.

Rotary Wire Brush Removes Insulation

Osborn Mfg. Co., Cleveland, is offering a new rotary wire brush for removing insulation from delicate electric conductors. Said to be as soft to the touch as velvet, it is shaped in form of a cylinder, 1½ inches in diameter and 2 inches long.

The wire in the brush is so fine and so closely packed that there are nearly a quarter of a million points over the surface area. The brush was designed to remove the insulating material from wire without marring the copper underneath.

Drum Opener

Industrial Products Co., 2820 North Fourth street, Philadelphia, announces a new drum opener designed to save time and reduce hazards in opening light and medium weight drums. It is said to cut smoothly, quickly and evenly, folding in the cut edge close to the side. Operation of the tool is simple, being made by a series of downward

strokes. When head is entirely cut through it is removed by grasping with beaks of the tool.

Industrial Sweeper

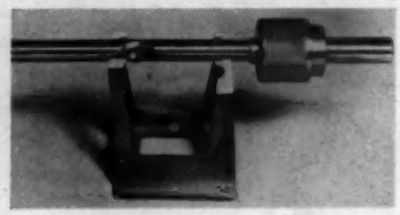
Moto Mower Co., 4600 Woodward, Detroit, announces a mechanized sweeper, known as the Detroit Moto-Sweeper, for cleaning smaller and medium-size plants. It can be operated by a man or woman and can get into close places, cleaning at the rate of 16,000 square feet per hour. The illustration shows it being used in and around machines in a tool, die and fixture shop. Heavy metal machinings are picked up as easily as the lighter dirt and dust.

Two larger motorized models, having sulkies as optional equipment, are avail-

able for plants with large floor areas. These, known as the Commander and Fleetway models, are completely maneuvered and operated by a 2-horsepower and 5½-horsepower tractor, respectively.

Burr-Removing Tool

Nobur Mfg. Co., Los Angeles, is introducing on the market a Nobur burr-removing tool which will remove burrs or sharp projections from edges of dril-



led, reamed or bored holes in one operation. The tool features special blade ground for a 2-step diameter, burring the outer face and inner shoulder of the ball-bearing seat simultaneously. It can be handled by anyone on any machine with complete safety.

The tool is available in 1/16-inch progressive sizes from 3/16 to 1 inch.

Correction Lombard Miller Table Size

Lombard Governor Corp., Ashland, Mass., calls attention to a typographical error in the specifications of its new combination horizontal-vertical milling machines described in the Jan. 25, 1943 issue of STEEL. Working surface of the table actually is 12 by 53 inches—not 12 by 13 inches as was stated on page 90 of that issue.

Advertisement FEBRUARY, 1943

COPPER ALLOY BULLETIN

REPORTING NEWS AND TECHNICAL DEVELOPMENTS OF COPPER AND COPPER-BASE ALLOYS

Prepared Each Month by the Bridgeport Brass Co. "Bridgeport" *Headquarters for BRASS, BRONZE and COPPER*

Memos on Brass—No. 35

When it is desired to join brass by soldering, oxides must be removed before starting work and oxidation prevented during the actual process. The latter is accomplished by the use of a flux which helps to maintain a clean surface and removes any oxides which may form during heating. The flux should be applied just before or at the same time as the heat. The soldering alloy to be used is determined by the minimum temperature that is needed on the pieces to be assembled, the melting point of the solder, its strength and cost. For general use, the 50-50 lead-tin alloy is usually satisfactory.

Brass and copper for munitions are an important part of Bridgeport's wartime production.

Duronze III Strengthens Wire Cable Connections

The application of Bridgeport's strong, corrosion-resistant Duronze III in the airplane construction, armament and heavy duty equipment may suggest other uses outside of present war needs.

Exceptional characteristics of Duronze III provide unusual serviceability. It is 50% stronger and 9% lighter than ordinary brass. In addition, this alloy is highly corrosion-resistant to fuel oils, exposure to the elements, sea water, dilute acids, and other chemicals. Although harder than most other alloys and unusually resistant to fatigue, Duronze III is free cutting, thus bringing many advantages to the design and manufacture of screw machine parts.

Bridgeport's special Technical Bulletin on the properties and uses of Duronze III will be gladly sent to you on request.

"Preventive Metallurgy" Saves Metal Waste...Loss of Time

Practical Precautions in Handling Copper Alloys Prove Particularly Valuable in War Production

Modern medicine emphasizes the practice of the *prevention* of sickness rather than its cure. The same idea can well be applied to metallurgical practices, particularly at the present time, in order to prevent certain metal failures with resulting costly losses in materials and labor.

Care Begins At Brass Mill

Numerous and varied operations must be carefully carried out at the mill in processing brass and bronze from mixing and melting the metals that go into the making of a given alloy to the finished sheet, rod, wire or tube. A slip-up anywhere along the line is likely to have injurious effects upon the quality or appearance of the finished material. This explains why so much emphasis has always been placed here in Bridgeport upon the importance of laboratory control at every step in production. Numerous checks, therefore, have been set up beginning in the casting shop and at each successive step through the processing of the metal. It is these factors that make possible consistent production of uniform high quality brass mill products.

Fabricators Must Follow Through

Care in the handling of the alloys must be exercised not only on the part of the brass producer but upon the part of the fabricator as well. It is just as important that a good sound length of brass sheet, rod, wire or tubing should be carefully handled to preserve its metallurgical qualities after leaving the brass mill as during its production. For in fabrication into any of the thousands of articles for which copper alloys are needed, the metal must be handled in ways that will assure satisfactory results in stamping, drawing and annealing operations...the soldering, polishing, plating, lacquering, etc., to which it will be subjected.

Keep Metal Clean

Cleanliness of the metal and close attention to annealing temperatures and atmosphere in particular will pay big dividends in lower rejections and less wasted man hours and materials. Unclean metal is probably the greatest single offender and can be blamed for many fabricating "headaches." For example, red stains sometimes found on shell cases after annealing and pickling are likely to be caused by the drawing solution that remained on the shell cases and had attacked or corroded the metal after standing for a period of time. When the shells are later annealed and pickled, the red stains may appear. To remove these will then require the additional operation and dissolving action of an oxidizing acid "dip" such as chromic acid pickle.

Another vexing problem may be black carbonacious deposits. These are difficult to dissolve in acid pickling solutions. Carbonacious deposits result from the annealing treatment operating at low temperatures and in reducing atmosphere; so that greasy soap drawing lubricants are carbonized instead of being burned off.

The way to overcome both red stains and black carbonacious deposits is, therefore, to prevent these actions taking place by removing the causes, rather than attempt to undo such conditions of the metal later. Applied "preventive metallurgy" in such cases would be to remove the drawing solution immediately after the drawing operation. In other words, anneal *clean* metal and *clean* metal will result. Modern annealing equipment as for example, that designed for handling cartridge cases, contains a chamber for washing the cases before they enter the annealing compartment. The annealed cases then go into a cleansing chamber to be sprayed with hot sulphuric acid solution, followed by a thorough washing in water.

Storing Shells or Cups

When it is necessary to put into storage cups or shells representing an intermediate operation, the best practice is to store them *after* annealing but *before* pickling. The reason for this is that during storage the shells may pick up dirt or grit which may scratch the tools and dies. Pickling the cups immediately before drawing will of course remove foreign matter. Storing dirty, wet cups or shells in their hard condition as they come off the presses, with the drawing lubricant on them, is poor practice because in some cases, the lubricant may attack or corrode the metal or else it may decompose into products giving off ammonia gas which may cause yellow brass shells to season crack. If annealing facilities are not immediately available, the cups or shells

(Continued on page 2, column 2)

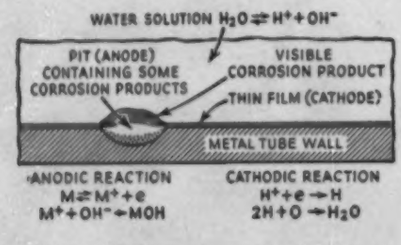
COPPER ALLOY BULLETIN

CAUSES OF CORROSION

ELECTROCHEMICAL THEORY OF CORROSION

This article, the second on the types of films which accelerate corrosion, is the fourth in a series of discussions by C. L. Bulow, research chemist at Bridgeport Brass Company, on some of the fundamentals of corrosion as applied to numerous common failures occurring in service. Previous issues of the Copper Alloy Bulletin *are available on request.*

The properties of visible corrosion films, which were pointed out last month, obviously aid in the formation of the concentration cell type of corrosion. The concentration cell begins to operate when the corroding substance is present in different concentrations at adjacent areas on the metal surface. The nature and distribution of sand and slime from various growths, weeds, leaves, silt, ashes, shells, etc., are also very important contributors to cell types of corrosion. It is known by power plant engineers that the removal of such


WATER SOLUTION $H_2O \rightleftarrows H^+ + OH^-$
PIT (ANODE) CONTAINING SOME CORROSION PRODUCTS
VISIBLE CORROSION PRODUCT
THIN FILM (CATHODE)
METAL TUBE WALL
ANODIC REACTION
$M \rightleftarrows M^+ + e$
$M^+ + OH^- \rightarrow MOH$
CATHODIC REACTION
$H^+ + e \rightarrow H$
$2H + O \rightarrow H_2O$

debris definitely prolongs the life of condenser tubes. In all instances the metal is corroded (anodic area which is pitted or dezincified) *where the oxygen concentration is least.* Where no deposit covers the metal (cathodic area) and therefore the oxygen concentration is the highest since the film is more permeable to oxygen, the hydrogen formed by the reaction $M + HOH \rightarrow MOH + H$ will be readily removed, according to the reaction $2H + O \rightarrow HOH$, which has already been discussed in the two previous articles. This reaction, together with the reaction of metal chloride reacting with sodium hydroxide, yields a metal hydroxide and sodium chloride:

(Continued in column 2)

Preventive Metallurgy Saves Metal Waste

(Continued from page 1, column 3)

should first be cleaned and dried before being put away in a dry clean store room free from ammonia fumes.

Bright Annealing

Alloys which oxidize badly when exposed to the air while still in a red hot condition should be annealed in a "bright" annealing furnace. Such a furnace is constructed so that the metal is surrounded by a reducing atmosphere during annealing and cooling. This prevents not only the necessity to clean off the scale but also serious loss in weight of the finished article that would normally result from sulphuric acid pickling followed by an oxidizing solution such as a nitric acid dip.

The counsel of our staff and the facilities of our modern laboratory are prepared to help you in every way possible in relation to your use of brass mill products.

Causes of Corrosion

(Continued from column 1)

$$MCl + NaOH \rightarrow MOH + NaCl$$

The localizing of the corrosion is due to the fact that differences in electrical potential exist between the various parts of the metal surface where localized corrosion is taking place. This corrosion is largely electrolytic or galvanic. The familiar dry cell in our flashlights functions because there is a potential or electrical difference between the zinc and the carbon when they are submerged in the same solution (electrolyte). Continuing this analogy, the anodic zinc pole (negative pole) corresponds to the areas of concentrated corrosion; the cathodic carbon pole (positive pole) corresponds to the slightly corroded areas; the sal ammoniac solution corresponds to the water or salt solutions (weak electrolytes); and the depolarizing or oxidizing agent manganese dioxide corresponds to the dissolved oxygen in the water or salt solution. The reactions involved may also be expressed in terms of the expressions used in the first article which appeared in the November edition of Copper Alloy Bulletin.

NEW DEVELOPMENTS

A motor-driven marking machine is offered, in which ink containing a small amount of etching acid is applied on small cylindrical parts with a rotating synthetic-rubber die. The work is placed by hand on a mandrel, and rotated by the die as it comes around into position. It is said that small finger size parts can be marked at the rate of 30 per minute. **(No. 410)**

A cleaning cloth made of treated material has been introduced to wipe metal surfaces of dirt, metallic particles, and other contamination that may prevent adherence of paint in the finishing operation. Tackiness in the cloth is increased by warming it and decreased by hanging it in the open air. **(No. 411)**

A tension-indicating wrench is available in four capacity ranges—250, 600, 1200 and 2400 inch pounds. Two revolutions of the pointer over the dial on each unit accompany operation to maximum capacity. One of two scales applies to each revolution so the markings can be widely spaced. The dial is actuated by deflection in two steel bars which make up the wrench shank and connect it to a square driving end to take a standard nut socket. **(No. 412)**

A tool sharpener has been developed which is said to sharpen any concave, convex, helical, straight, tapered, angled, or special milling cutter up to six inches in diameter, any reamer up to the same size, and any circular saw up to 18 inches in diameter. This new device has a special index dividing head which has seven index circles of micrometer-spaced holes or stops in multiples of 2, 3, 4, 5, 6, 7, and 13. It also has a special interchangeable table or flat-bed attachment. **(No. 413)**

An illuminated magnifier is offered which employs a fluorescent lamp and a five-inch lens with a focal length of 13 inches. The magnifier is available in either a flexible bench unit, weighing 8½ pounds, or a hand unit, weighing 5¼ pounds. Operation is on 110-volt 60-cycle ac. **(No. 414)**

A carbide cutting tool of tipped design is available in right and left hand designs for use in shell machining and in chamfering work. The tool is made with tips measuring ⅛ by 5/16 by ⅝ inches to ⅜ by ¾ by 1¼ inches. **(No. 415)**

A corrosion proofing liquid has been put on the market to coat wire work baskets that are to handle highly-finished metal parts so the wire will not contact the work and cannot tarnish it. The liquid is said to dry to a tough abrasion-resisting coating that is resilient and solvent-proof. Baskets so treated, it is said, can be used to carry work through degreasing equipment without affecting the coating. **(No. 416)**

This column lists items manufactured or developed by many different sources. Further information on any of them may be obtained by writing Bridgeport Brass Company, which will gladly refer readers to the manufacturer or other source.

PRODUCTS OF THE BRIDGEPORT BRASS COMPANY

Executive Offices: BRIDGEPORT, CONN.—Branch Offices and Warehouses in Principal Cities

SHEETS, ROLLS, STRIPS—*Brass, bronze, copper, Duronze,* for stamping, deep drawing, forming and spinning.

CONDENSER, HEAT EXCHANGER, SUGAR TUBES—For steam surface condensers, heat exchangers, oil refineries, and process industries.

PHONO-ELECTRIC* ALLOYS—High-strength bronze trolley, messenger wire and cable.

WELDING ROD—For repairing cast iron and steel, fabricating silicon bronze tanks.

LEDRITE* ROD—For making automatic screw machine products.

"Bridgeport" Brass Co.

COPPER WATER TUBE—For plumbing, heating, underground piping.

DURONZE ALLOYS—High-strength silicon bronzes for corrosion-resistant connectors, marine hardware; *hot rolled sheets* for tanks, boilers, heaters, flues, ducts, flashings.

BRASS, BRONZE, DURONZE WIRE—For cap and machine screws, wood screws, rivets, bolts, nuts.

FABRICATING SERVICE DEPT.—Engineering staff, special equipment for making parts or complete items.

BRASS AND COPPER PIPE—"Plumrite"* for plumbing, underground and industrial services.

Established 1865

BRIDGEPORT BRASS

Note: Bridgeport products are supplied in accordance with existing priority regulations.

ARMY E NAVY

*Trade-name.

Specifications

(*Concluded from Page 83*)

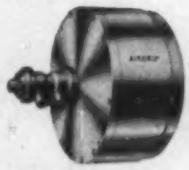
9200, 9400, 9500 and 9600 series. The War Department has made every effort to keep the number of necessary steel compositions to a bare minimum. No grade for which there is no particular need is included. For this reason, not all carbon ranges of each base composition are listed as WD steels. Particular attention is called to the fact that the chemical ranges for the WD lean-alloy steels (NE) are maximum and minimum limits for acceptance or rejection.

Prior to the war there existed an abundance of molybdenum. Since the cost of this alloying element was quite reasonable, there was no need to hold the range within narrow confines. However, its recent extensive use to replace other more critical ferro-alloys has resulted in an extremely critical situation with regard to present supplies. This led to a review of all possibilities offering opportunities of a reduction in its use and requirements. The Army Ordnance, a principal user, made a thorough survey, reducing and eliminating molybdenum steels wherever possible. The early acceptance and adoption of the new leanest-alloy steels was an important factor in this connection.

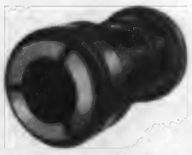
Further, in co-operation with AISI and WPB, the molybdenum content of the WD-4100 series steels was reduced from 0.15-0.25 per cent to 0.13-0.20 per cent. While this change may appear relatively unimportant, it will nevertheless result in a saving of 300,000 pounds of molybdenum during 1943. This extensive conservation is entirely the result of a reduction in average composition. Heretofore the average content of the 4100 series steels has been 0.22 per cent molybdenum. By shortening the range and dropping the minimum required by 2 points, the average is now more nearly 0.17 per cent, or a saving of 0.05 per cent (1 pound per ton).

It is reported that the AISI will include in its next revision of *Steel Products Manual No.* 10 a series of 4100 steels whose molybdenum content will range from 0.14 to 0.19 per cent. The development of the new lean-alloy steels by industry and the reduction of molybdenum in 4100 series steels are examples of specification changes that have made important contributions to the conservation of critical materials. To perhaps an even greater extent, however, the policy of conserving critical materials is furthered by drawing changes calling for a leaner instead of a richer alloy, using existing specifications. Thus a drawing change from WD-2340 to WD-9440 would constitute an important saving of nickel, without the necessity of preparing additional specifications.

When You Equip Lathes, Vertical Millers, and Drilling Machines with "Airgrip" Chucking Devices.



Anker-Holth revolving air cylinder



Anker-Holth air operated collet chuck

Anker-Holth air operated, three-jaw, universal chuck

MANY of America's leading aircraft engine and parts plants are using Anker-Holth air-operated chucking devices to speed output—to help planes fly away faster to the battle fronts.

If you are an engine or parts manufacturer we urge you to investigate the use of "Airgrip" cylinders, chucks, and other air-operated and hydraulic devices, which consistently result in *stepping up production by 25% or more.*

Our engineers are ready to help you in the selection and installation of air operated chucking devices on new machines now on order, or on machines now operating in your plant. Our deliveries are extremely favorable for prompt action. Send in your piece part prints. Act today!

Write FOR NEW CATALOG

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"AIRGRIP" CHUCK DIVISION

332 So. MICHIGAN AVE. • CHICAGO, ILL.

On the Line — in production and in combat . . .

AAF FILTERS PROTECT THEM FROM DUST

● DUST is a major problem both in the *manufacture* and *maintenance* of our great air armada. The important part which dust control plays in *manufacture* was soon discovered by airplane builders who turned to AAF engineers early in the war emergency to solve their dust problems.

Following *manufacture* came *maintenance*, which due to make-shift airport facilities necessary in combat zones, again found dust a serious hazard. Engine performance records in Libya, Australia and elsewhere, made under actual fighting conditions, show that motors not protected by air filters require overhauling and rebuilding after only 20 to 30 hours, due to the severe dust conditions. With AAF airplane engine filters, which remove 90% to 99% of the dust which causes this excessive wear, the period between overhauls can be increased to 300 or 400 hours, thus saving valuable replacement parts and greatly reducing oil and gas consumption.

So—on the line—in production and in combat AAF filters protect our war planes.

If you are confronted with a dust problem we can help you too! Write for new bulletin, "AAF In Industry".

AMERICAN AAF AIR FILTERS

AMERICAN AIR FILTER CO., INC.
INCORPORATED
443 CENTRAL AVENUE LOUISVILLE, KENTUCKY
IN CANADA: DARLING BROS., LTD., MONTREAL, P. Q.

Rolls for Galvanizing

(*Concluded from Page 90*)

see that there is not a high concentration of the heat down in the bottom of the pot.

This produces excessive dross. At temperatures above 900 degrees Fahr. this zinc-iron is very hard and sandy, carries a high iron content and has a powerful expansive force. When this kind of material gets into the grooves, it can crack the roll.

High temperatures also favor pitting of the surface. The attack is weak at low temperatures, whereas at high temperatures the violence of the attack has the power to seek out the spots in the surface easiest to damage. A uniform attack over the entire surface is a general condition at low temperature.

In conclusion, remember that rolls should be kept turning continually in the bath when there is a stoppage of production.

A surface with zinc on it burns very easily in the air, and if the rolls are continually turning in the metal this keeps the surface always "wet" and in good condition for applying the zinc coating just as soon as production starts through again. In case of long shutdowns it is best to remove the exit rolls from the bath.

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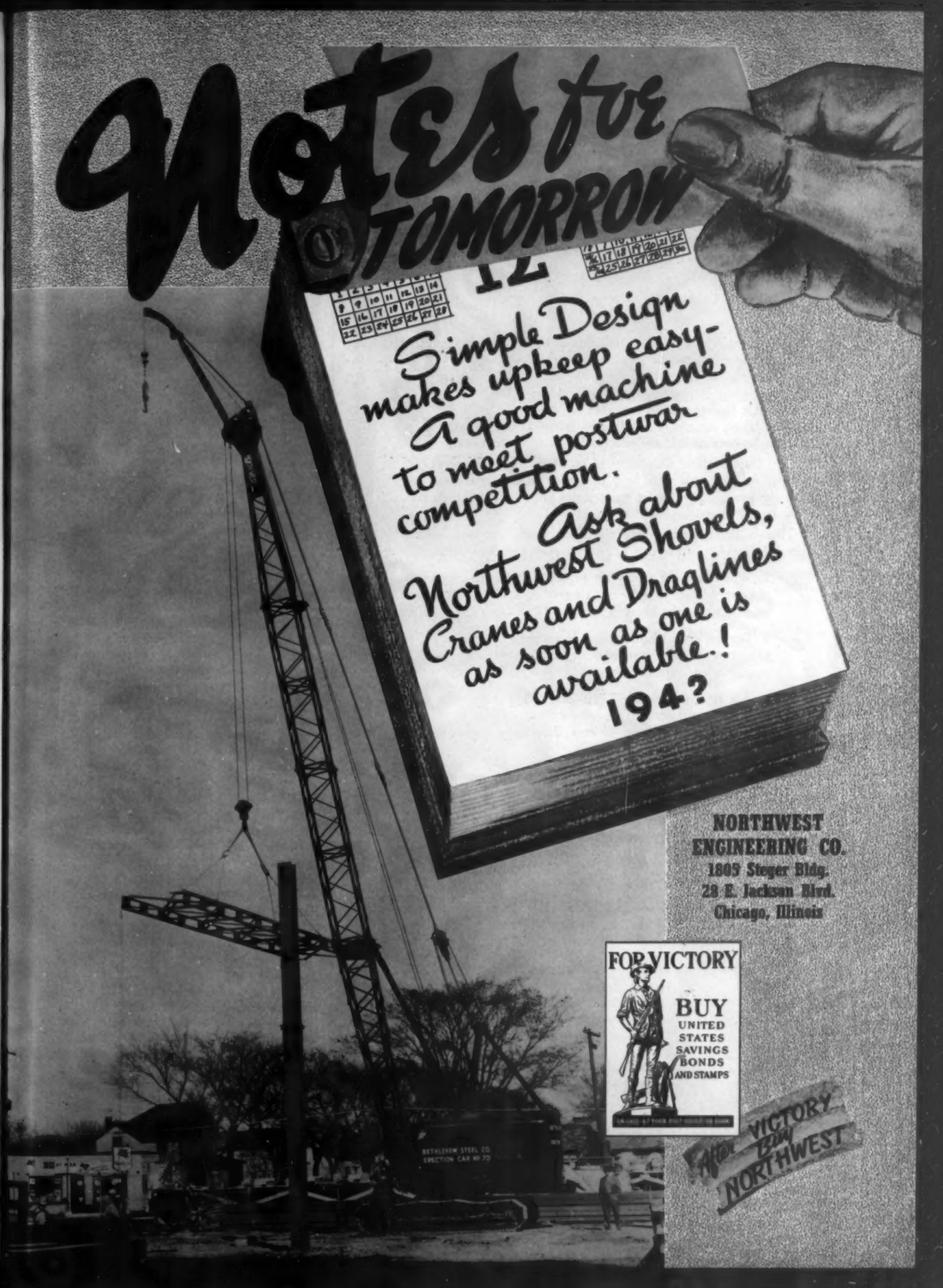
Notes for TOMORROW
12
Simple Design
makes upkeep easy-
A good machine
to meet postwar
competition.
Ask about
Northwest Shovels,
Cranes and Draglines
as soon as one is
available.!
194?
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FOR VICTORY
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BONDS
AND STAMPS
After VICTORY
Buy
NORTHWEST

Longer Service from Your CURTIS AIR HOISTS and CYLINDERS

★ Curtis Air Hoists and Curtis Air Cylinders are speeding production of war work, releasing skilled labor for other jobs, and reducing costs in plants all over America. Curtis Air Hoists can be operated by unskilled labor, are easily handled by women, and, because they cannot be overloaded, are practically immune to abuse.

But despite their simplicity of construction and operation, proper maintenance will help to insure and extend their unusually long life — for in many cases they may have to last for the duration.

Follow these maintenance tips, and you'll get the longest possible service from your Curtis air-powered equipment:

✔ **1.** When running a new air supply line, or relocating an old one, be sure to blow out all grit, rust, and chips before connecting to the hoist.

✔ **2.** Do not install hoists close to an open furnace or other source of heat without shielding, otherwise piston leather may char or lubricant dry out.

✔ **3.** For smooth operation and long life, put one-half pint of heavy cylinder oil into the cylinder through the oil plug in rear head every 30 days. This keeps piston leather soft and prevents air leakage.

✔ **4.** If piston jumps or jerks, it indicates improper oiling or binding of rod stuffing box. Keep stuffing box leak-tight only.

✔ **5.** Fill oil cup on valve every 30 days. This admits two drops of oil every time hoist valve is operated.

✔ **6.** Drain off any condensation in cylinder periodically through drain plug in lower head.

✔ **7.** Check valve disc and seat occasionally to prevent wear from grit or dirt in air line. A worn valve causes "creeping" and loss of efficiency.

✔ **8.** By keeping hoists and cylinders clean, properly lubricated, and by replacing broken or worn-out parts now, you can increase the efficiency and long life of your equipment and prevent production shut-downs in the future.

CURTIS PNEUMATIC MACHINERY DIVISION
of Curtis Manufacturing Company
1996 Kienlen Avenue • St. Louis, Missouri

Conveyor Aids Cleaning

(*Concluded from Page 92*)

are mounted at the front of the machine. Wheels are staggered as to height from the floor to give an abrasive blast to all parts of the work and to provide for cleaning a wide range of work sizes. Each wheel is driven by an individual 20-horsepower totally enclosed fan-cooled motor.

Work is loaded outside the cabinet on hooks suspended from the conveyor and at a point opposite one of the short sides of the cabinet. The conveyor moves each hook one station at a time, and in normal operation at the Spring City Foundry 40 hooks pass through the machine per hour, each with a loading capacity of 2000 pounds. The conveyor carries the work before the wheels several times, stopping and rotating it directly in front of each wheel just before taking it out of the cabinet.

Work Hit from All Sides

On entering the cabinet the work, traveling parallel to the blast wheels but at the far side of the cabinet, receives the benefit of abrasive that misses work directly in front of the wheels and rebounds from work at other positions in the cabinet. The work takes numerous other positions in the cabinet as it progresses toward positions directly before the blast wheels. The conveyor then passes the work out of the cabinet for inspection and unloading.

Thirty-seven hooks or positions are provided on the conveyor. Twenty-two hooks are within the cabinet or in entrance and exit stations at one time, while the remaining 15 hooks are outside the cabinet in loading or unloading positions.

Multi-pass of work before the wheels is said to permit proper cleaning action from the abrasive and at the same time to shield walls of the cabinet from direct abrasive blast.

In operating practice at Spring City Foundry, the bulk of the cleaning is done on the shift when pouring is lightest. Work taken from the molds goes to shakeout and then is stacked adjacent to the special cabinet for cleaning. Size 17 shot is used in the machine.

Four men normally are employed in blast cleaning operations, two for loading and two for unloading. Work is staggered on the hooks, with very large pieces in one position and a group of small pieces on the adjacent hooks. Overhead hoists facilitate loading of large castings and their transfer to grinders after cleaning. Small castings are stacked on skids and moved by truck from shakeout to the machine and then to the grinders.

Spot Welding

(*Continued from Page* 98)

pers. An article appearing in the April, 1942, issue of *The Welding Journal* includes the work on the 0.040-inch material of both annealed and half-hard tempers, and a second article appearing in the May issue includes the work on the 0.070-inch material of both annealed and half-hard tempers. A discussion of the information contained in both articles is included in this paper.

"For the present investigation we were fortunate in securing the co-operation of the engineers of the General Electric Co., Schenectady, N. Y., in developing a panel which permits accurate control by fully electronic means of the following time intervals: (1) Time of weld. (2) Time between weld and heat treatment. (3) Time of heat treatment. In addition to the accurate time control the equipment provides independent adjustment by means of phase control, of welding current and heat-treating current.

By means of this flexible control equipment, the proper conditions for producing welds in hardenable steels have been developed. Such control equipment may easily be made commercially available at only a moderate increase in cost over ordinary spot-weld control equipment with phase control of welding current.

"For production work in the shop it is possible that a very simple mechanical timing system, such as the chain timing equipment which is now on the market, may be used. This equipment requires a few minutes to change welding conditions, but it appears that the timing intervals may be definitely set up for particular gages, and these timing conditions may then remain unchanged as long as the gage of material is the same. For experimental work in the research laboratory, or where the type of work in commercial production is very frequently changed, the electronic equipment makes possible more rapid change in timing conditions." (*The Welding Journal*, 21 (4), Research Supplement, 203-s to 208-s, 1942, "The Spot Welding of N-A-X High-Tensile Steel", by W. F. Hess and C. R. Schroder.)

0.040-Inch N-A-X High-Tensile Steel: The results obtained as a result of investigation carried out on the material of 0.040-inch thickness will be discussed first. Here again the reader is referred to the April, 1942, issue of *The Welding Journal*. The subject article in this publication contains the complete figures, tables, curves and data pertaining to actual welding conditions. The following effects will be discussed in order:

"Well Done" jobs have for many years been a commendable characteristic of WYCKOFF peacetime steel production. In today's fight for freedom, the distinguished joint awards—the Army-Navy "E" and *added* STAR—honors WYCKOFF Production Soldiers as true fighting partners—shoulder to shoulder—eye to eye—purpose to purpose!
Our steadfast resolve—to continually improve our war assistance production—is daily evidenced by WYCKOFF'S "carry-on" spirit and increasing flow of WYCKOFF steel for *victory*.
E
E
ARMY
NAVY
Awarded to Wyckoff Production Soldiers ... Three Production Awards
1. Bureau of Ordnance Flag and Navy "E"
2. All-Navy "E" Burgee
3. Army-Navy "E" with *added* STAR
W

Deep-drawing made it light and strong enough to fly

This cylinder, a reservoir of hydraulic energy for aircraft use, is another example of the way in which the Hackney Deep-Drawing Process helps manufacturers strengthen and reduce the weight of parts simultaneously.

Hydraulic energy to feather propellers, operate landing gear, flaps, etc., requires accumulators which are light in weight, yet are strong enough to withstand high internal pressures.

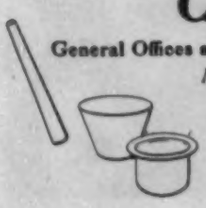
Hackney engineers co-operating with the accumulator manufacturer developed a cylinder to meet the exacting specifications. Unnecessary weight was eliminated and uniform sidewall thickness was assured by cold drawing. Ample strength was assured by electrically controlled heat-treating.

In addition to successfully meeting the weight-strength requirements, the Hackney Deep-Drawing Process makes important savings in time and materials as no machining is required for weight reduction in producing these improved products.

If you have a problem which deep-drawing might solve, let Hackney's engineers help you. Their experience may enable you to overcome manufacturing difficulties, meet war material limitations or effect product improvements. Write for details.

Pressed Steel Tank Company

General Offices and Factory · 1461 SOUTH 66th STREET
Milwaukee, Wisconsin



DEEP-DRAWN
SHAPES AND SHELLS

(1) Effect of weld size. (2) Effect of interval between weld and heat treatment. (3) Effect of magnitude of heat-treatment current. (4) Effect of time of heat treatment.

Effect of Weld Size: During the early part of this investigation it became apparent that, for spot welds of medium diameter, an increase in spot diameter was accompanied by a definite corresponding increase in the U-strength to shear-strength ratio. This was found to be true even when the welds had no subsequent post heat treatment in the welding machine. The U-strength increased more rapidly than the shear strength for increasing weld diameters up to a maximum diameter, above which there was little or no increase. This diameter above which no appreciable increase in U-strength to shear strength ratio was found for an increase in weld diameter was taken as the minimum or optimum spot diameter to be used in the investigation of the effects of post heat treatment. For the 0.040-inch material, both in the annealed and half-hard tempers, this minimum diameter was found to be about 0.210 to 0.220-inch and was obtained by using ¼-inch flat tips.

When the spot diameter was only 0.150-inch, using 3/16-inch flat tips, the ratio of U-strength to shear strength obtained was about 10 per cent for an as-welded specimen using no subsequent heat treatment. This ratio could be increased to about 30 per cent for an identical as-welded specimen, using ¼-inch flat tips which gave a spot diameter of about 0.220-inch.

It is evident that if the spot diameter were lowered to a value considerably below 0.150-inch, a diameter would be found at which the ratio would again increase to a very high value since the weld would be entirely too small and would have a very low U-strength and also low shear strength. The ratio would be high, but the actual strength values would be very low. Such welds, of course, would be of no practical value.

Effect of Time Interval Between Weld and Heat Treatment: The time interval between weld and heat treatment was found to be a very critical and important factor in increasing the toughness of spot welds by means of post heat treatment in the welding machine. It was found that for a weld made under given conditions, there exists a critical minimum time during which the weld must cool to below the martensite forming temperature before the complete advantages of the heat-treating cycle can be obtained. Although no definite critical maximum time between weld and heat treatment was found to exist with-

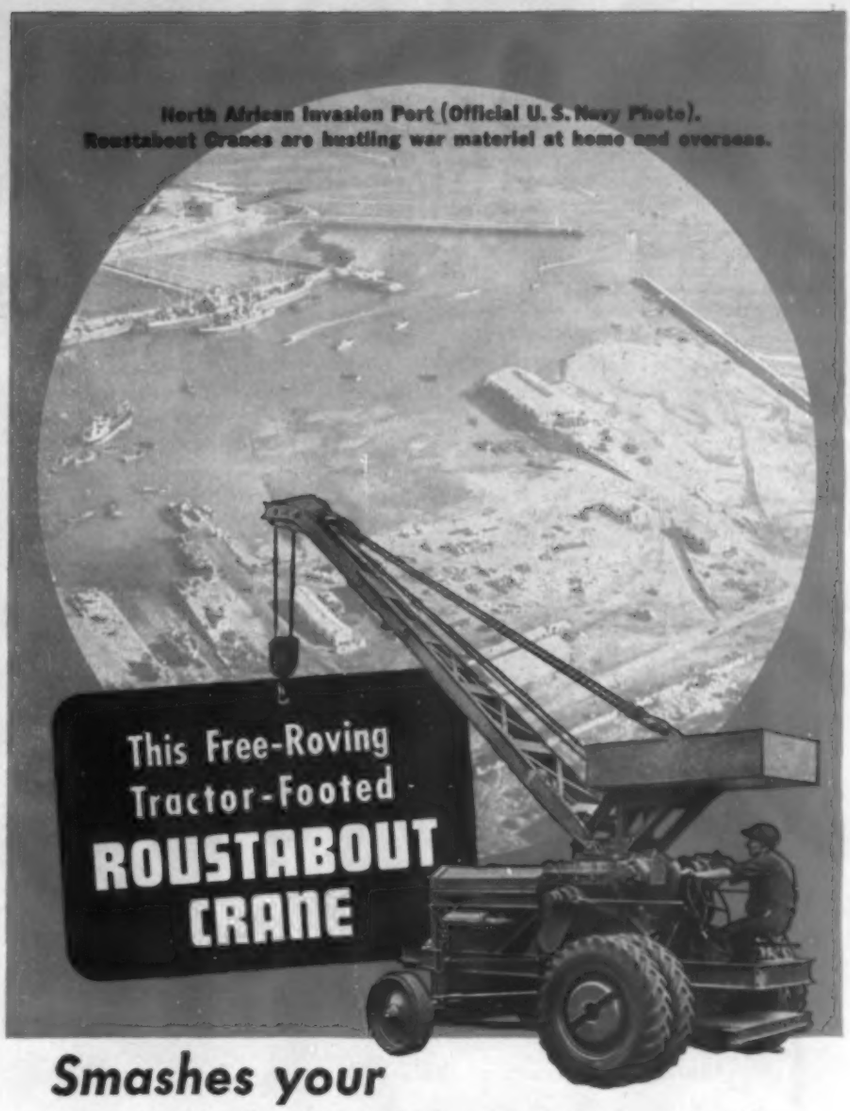
in reasonable limits, still, practical reasons alone dictate that the minimum time with a slight safety factor should be adhered to. This is also consistent with sound metallurgical practice since drawing or tempering a fully quenched transformation product as soon as possible after the quench has its well-known advantages.

This critical time interval between weld and heat treatment was found to be about 12 cycles (1/5-second) for the 0.040-inch material. For constant welding conditions, time of heat treatment and heat-treating current, the ratio of ultimate strength to shear strength could be doubled as this critical time interval was increased from 10 to 12 cycles. In fact, as this time between weld and heat treatment is lowered to a value below 10 cycles, the actual ratio of ultimate strength to shear strength drops below the as-welded ratio. The reason for this will be discussed under the section covering the investigation of the 0.070-inch material, for it was during this latter investigation that the reasons for this observed characteristic became more apparent by a correlation of Vickers hardness surveys across the weld and changes in ratio of ultimate strength to shear strength.

Hardness surveys were taken in all cases, and with proper heat-treating procedure the expected drop in hardness of both weld and heat-affected zone was noted, with increasing weld toughness and increasing ratio of U-strength to shear strength.

The investigation of the time interval required between weld and heat treatment for the 0.040-inch material gave indication that the cooling rate for spot welds made under the conditions of this work and in the material of 0.040-inch thickness was in the neighborhood of 7000 to 10,000 degrees Fahr. per second between the melting point and the martensite forming temperature. This makes evident the fact that to arrest the cooling at a definite temperature level and holding to give an isothermal transformation product would be very difficult in material of this thickness. It is understood that the possibility exists whereby spot welds made in thick gages, and consequently having a considerably slower cooling rate, may be successfully transformed at constant temperature in the welding machine.

Effect of Magnitude of Heat-Treating Current: Since the critical time interval between weld and the heat treatment was found to be about 12 cycles, a safety factor of 2 cycles was allowed, and the other effects of heat-treating current and time of heat treatment were investigated by holding the time be-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tween weld and heat treatment constant at 14 cycles.

The magnitude of the heat-treating current was found to vary inversely with the time of heat treatment. This would be expected. However, it was also found that the optimum value for magnitude of heat-treating current became far more critical with both comparatively short and long-time heat treatments. The shortest time of heat treatment investigated was 2 cycles and the longest was 60 cycles. As the magnitude of the heat-treating current approaches an optimum value for a given time of heat treatment, the weld structure begins to soften from the center out toward the edge. When the optimum value of heat-treating current has been reached, the junction of weld and heat-affected zone has been softened to the greatest extent possible by this method. The center of the weld may begin to show rehardening as the heat-treating current is increased to values above the optimum, for then definite rehardening takes place.

Slight rehardening at the center of the weld does not lower the ultimate-strength-to-shear-strength ratio and does not offset the beneficial effects of the heat treatment. In many cases a slight rehardening of the weld center was necessary to give a minimum softness at the weld-heat zone junction, which resulted in the highest ultimate-strength-to-shear-strength ratios. If, however, the rehardening has spread far enough to begin to affect the above-mentioned weld-heat zone junction, then all beneficial effects of the heat treatment are lost. With the proper time interval between weld and heat treatment and the proper heat-treating current and time of heat treatment, the weld structure, including the heat-affected zone, can be softened from about 420 to 440 Vickers as welded, to about 280 to 300 Vickers as welded plus heat treatment in the welding machine. This, of course, applies to the 0.040-inch N-A-X high-tensile steel used in this investigation.

For heat-treating times of approximately the same number of cycles duration as the actual welding time, it was found that the optimum value of heat-treating current was not too critical. The values of heat-treating current were always plotted as percentage of welding current since this percentage remained fairly constant for definite conditions producing similar results, whereas the actual heat-treating and welding amperage values may vary considerably. This would be an expected observation since the spot diameter or weld size will vary directly with the welding amperage for a given electrode tip diameter, and the actual heat-treating amperage required to produce given results will also vary directly with weld size.

Effect of Time of Heat Treatment: As mentioned before, the magnitude of heat-treating current is closely associated with the time of heat treatment and becomes more critical with comparatively long and short times of heat treatment. The range of heat-treatment time investigated was from 2 to 60 cycles. For practical reasons, the heat-treating time should be kept as low as is consistent with desired results and current flexibility. It was found that a heat-treating time of approximately the same number of cycles duration as the welding time gave sufficient softening and toughening of the weld structure, with optimum current values which were not too critical for ordinary electron-tube controlled welding machine operation.

For short-time heat treatments, the current must be adjusted so as to give maximum softening at the weld-heat zone junction, and rehardening will be found at the center of the weld. Since the time is very short and the current value high, a slight increase in current will result in spreading the rehardened

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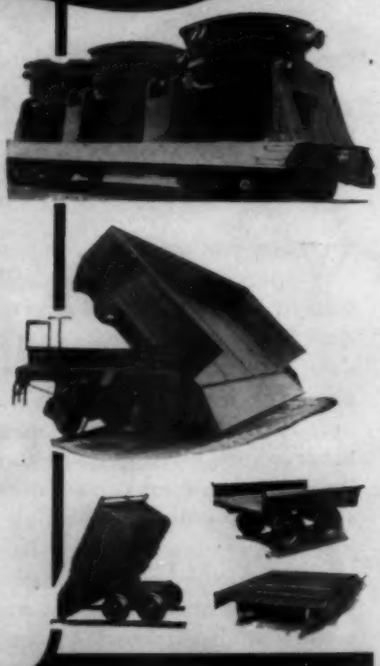

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Helpful Literature

1. Machining Stainless

Rustless Iron & Steel Corp.—24-page illustrated bulletin, "Shop Notes on the Machining of Stainless Steel," was written to aid shop men in solving new problems involving stainless steel machining for war production. Broad classifications of stainless steel types are covered. Also given are such data as cutting rates, turning operations, tool applications, drilling, threading, tapping and reaming. Tool selection chart is included.

2. Globe & Check Valves

Watson-Stillman Co., Distributor Products division—36-page illustrated bulletin No. A-4 is manual on bronze, forged steel and cast steel globe and check valves. Each type valve is shown and full specifications and prices are listed. Sectional views indicate type of construction used. Also covered are typical applications.

3. Gear Finisher

Michigan Tool Co.—4-page illustrated bulletin No. 860-B gives complete specifications on model 860-B rotary gear finishing machine. In these units work is reciprocated axially during the cutting cycle, while cutters are fed into work by raising cutter table predetermined amount for each stroke of head. Gears up to 5 inches in width and 16 inches in diameter can be handled.

4. Skin Protection

Mine Safety Appliances Co.—16-page illustrated bulletin gives complete information regarding "Fend" which is complete line of creams and lotions designed to create an effective barrier on worker's skin against industrial dermatitis. Applications of various types for specific skin troubles resulting from industrial exposures are tabulated.

5. Shovel Dragline Crane

Link-Belt Speeder Corp.—12-page illustrated catalog No. 1943 describes 1¼-yard heavy-duty model LS-120 crawler shovel dragline crane. Included among features of machine are all-welded unit construction instead of castings; self-aligning center pin bearing; self-aligning rotating rollers, and fully independent rapid boom-hoist. General dimensions, clearances, lifting capacities and specifications are given.

6. Regrinding Metal Tools

Norton Co.—24-page illustrated booklet, "How To Increase Tool Life", discusses refined surface finishes as applied to regrinding of metal cutting tools. Booklet explains why cutting tools wear out and shows how use of fine grit abrasive wheel produces keener edge with less tool wear.

7. Die Steel

Jessop Steel Co.—8-page illustrated bulletin No. 742 gives full data on "C.N.S." air-hardening die steel. Information is given regarding working, applications, performance and tempering. This material was developed for air hardening, but it can also be oil hardened if desired.

8. Spray Painting

Paasche Airbrush Co.—8-page illustrated bulletin No. FM 9-42 describes production type airbrushes, material cup assemblies, pressure tanks, and other airpainting units. This equipment is designed for finishing all types of material in industry.

9. High Speed Steel

Latrobe Electric Steel Co.—4-page illustrated bulletin entitled, "Latrobe Double Six," gives typical analysis, forging, hardening, annealing and drawing data as well as applications of this high speed steel. Charts are included on hardening and drawing curves. Results of impact tests are tabulated.

10. Collet Chucking Fixture

Zagar Tool, Inc.—8-page illustrated catalog entitled, "The Zagar Collet Chucking Fixture," tells how to simplify and speed up indexing or holding work on machine tools. These fixtures are available for two purposes: (1) for holding and indexing and (2) for holding only. Each type is furnished in 1 and 2-inch sizes, with capacities up to and including 1 and 2-inch diameter round shanks.

11. Zinc Products

New Jersey Zinc Co.—4-page illustrated bulletin, "From Mine to Battlefront," describes and shows typical uses of metallic and pigment forms of zinc in war equipment. Mining, processing, manufacturing and testing procedures are traced through to finished product.

12. Plant Facilities

Inland Steel Co.—8-page booklet lists seventy-four plants with available capacity for war work. Companies listed, most of which are located in Middle West, have had normal business suspended or curtailed and are anxious to do war work. Facilities of these plants are summarized.

13. Nickel Alloy

International Nickel Co., Development and Research division—16-page illustrated bulletin T-9 discusses engineering properties of "K" Monel. Bulletin contains separate chapters on properties, working instructions, thermal treatment, corrosion resistance, mill products, range of mill sizes and applications.

14. Zinc Plating

Udylite Corp.—11-page technical bulletin No. Z-1A and 4-page technical bulletin No. Z-6 are entitled, "Bright Zinc Plating," and "Zinc versus Cadmium Plating," respectively. Both of these papers give procedures, applications and recommended equipment for particular plating methods.

15. Steel Flooring

Kerlow Steel Flooring Co.—4-page illustrated folder on open steel flooring and steps describes principal patterns of gratings and their applications. Includes tabulation of safe loads for various sizes, weights and lengths of this type of flooring. Explains details of constructions and methods of installation, together with photographs of typical installations.

16. Precision Gages

Turner Gauge Grinding Co.—4-page illustrated bulletin, "The Stamp of Precision," explains facilities and methods used in manufacture of precision gages. Line includes snap, ring, plug, flush pin and special gages, and typical units are shown.

17. Tool Steel Welding Rods

Welding Equipment & Supply Co.—16-page illustrated catalog describes "Eureka" tool steel welding wires for electric arc, atomic-hydrogen and oxy-acetylene welding. Typical examples of use of "Drawalloy" electrodes for repairing and forming dies are given. Prices on tool steel welding wires are included.

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18. Precision Gages

Perfex Gage & Tool Co.—4-page illustrated booklet on precision gages outlines manufacturing technique of this company and shows such typical products as flush pin, contour snap, single end thread, arbor concentricity, adjustable snap, contour and other precision gages. Inspection instruments used for checking these gages are shown.

19. Materials Handling

Lamson Corp.—9-page illustrated folder, "Win the Battle Of Production", shows how Lamson conveyors and dispatch tubes save time, space and negative motions, thereby speeding up production. Applications of several models are shown.

20. Industrial Paging System

Executone, Inc.—6-page illustrated bulletin No. 197 describes this two-way communication system which permits paging or call origination from any station. Call can be broadcast over all stations to reach key men in shops. Optional two-way private conversation can be conducted between two or more stations. System accommodates from two to 70 stations.

21. Holding Devices

Anker-Holth Manufacturing Co.—28-page illustrated bulletin on "Airgrip" pneumatic and hydraulic holding devices gives complete data on chucks, revolving air cylinders, shell holding equipment and double-acting non-rotating cylinders. Also described are accessory units for use with these devices.

22. Metallizing Equipment

Metallizing Company of America—20-page illustrated bulletin "Mogul Metallizing Process and Equipment," explains this process and how it is being used in aircraft, automotive, mining, manufacturing and other industries for protection, maintenance and repair. Metallizing gun and accessory equipment are described.

23. Oil Burner

Hauck Manufacturing Co.—16-page illustrated catalog No. 407 describes proportioning oil burner for precision control of temperature and atmosphere in all heating applications. Burner automatically proportions primary and secondary atomizing air and oil from minimum to maximum capacity. Various models are shown and operational data and specifications are listed.

24. Materials Handling

Factory Service Co.—20-page illustrated bulletin on "Turner System of Material Mobilization Equipment," explains development and applications of this system which employs racks, bins, trays or boxes mounted on wheeled transport chassis. Latter element is moved readily by hand lever type "Jimmy" which may be used to lift and haul loaded chassis. Variations in equipment are described.

25. Electric Drive Control

Westinghouse Electric & Manufacturing Co.—14-page illustrated booklet No. B-3123 is descriptive of "Rototrol" direct current drive control which is designed for use where wide spread speed range or close regulation is required. Text and illustrations explain how unit increases speed range; keeps speed of direct current motor constant regardless of load variation; gives uniform acceleration and deceleration.

26. Warehouse Service

Joseph T. Ryerson & Son, Inc.—20-page illustrated anniversary booklet, "100 Years of Peace and War," reviews growth of company and nation during past century. Drawings dramatize important events which have influenced civilization in relation to steel. History-making happenings are reviewed by decades. Story of founding and growth of Ryerson organization is told.

27. Case Carburizing Steel

W. J. Holliday & Co.—6-page illustrated bulletin No. 942 presents complete data and application information on "Speed Case" low carbon open hearth case carburizing steel and "Speed Treat" medium carbon open hearth steel. Both materials are stocked in standard hot rolled plates and hot rolled and cold drawn bars. Specifications, heat treatment, welding and typical uses are outlined.

28. Steel Heat Treating

American Steel & Wire Co.—16-page illustrated bulletin on "Austempering" contains description of this process which consists of heat treating steel into the Austenitic state and quenching it directly into constant temperature bath. Hardness and toughness obtained adapt steel for knife blades, slide parts, spring clasps, lock washers, screw driver blades and other products which are shown.

29. Lock Washers

National Lock Washer Co.—18 x 16½-inch wall chart tabulates recommended "Kantlink Spring Washers" for use with wrench head bolts, nuts and screws, slotted head screws, machine screws and stove bolts, and socket head cap screws. Screws and bolt sizes and washer sizes are listed. Variations of sections to suit particular bolts or screws are demonstrated by actual samples of each washer, attached to chart.

30. Induction Hardening

Ohio Crankshaft Co., Tocco division—30-page illustrated bulletin, "Surface Hardening by Induction," is reprint of lecture by Dr. H. B. Osborn, Jr. before the Electrochemical Society. Applications and methods used for high frequency induction heating for localized surface hardening are covered. Typical equipment and work performed are shown.

31. Abrasive Cutting

American Chain & Cable Co., Andrew C. Campbell division—32-page illustrated technical bulletin, "Abrasive Cutting," covers development and application of this method. Advantages, wet and dry cutting, machines, coolants, methods of cutting, wheel speed, and cutting pressures are but few of subjects treated.

32. Electric Furnace Elements

Hevi Duty Electric Co.—6-page illustrated bulletin No. HD-740 presents complete details regarding "Radiant Heat" element construction which is used in "Hevi Duty" industrial furnaces. Features of this design and typical applications of it in various types of furnaces are described and shown.

33. Electronics

General Electric Co.—31-page illustrated booklet No. GED-1024 tells story of electronics in past and present, and foretells its great possibilities for the future. Colorful pictures and text describe role electron is playing in war, industry, medicine, agriculture, radio and television.

34. Carton Stitchers

Acme Steel Co.—6-page illustrated folder entitled, "Silver Stitchers," describes various standard and special types of carton stitchers available to shippers of war products. These machines close tops of regular and special cartons with wire stitches. Detailed specifications and illustrations are shown.

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area to the weld-heat zone junction, and a slight reduction in current will not produce enough heat to soften this junction. When the time of heat treatment is long, the corresponding optimum heat-treating current is comparatively low, and a slight increase or decrease in current value will produce the undesirable results above mentioned. Thus the magnitude of the heat-treating current is far more critical with very long or very short heat-treating times.

Microscopic Examination: The as-welded microstructure with no subsequent heat treatment is extremely hard and brittle. The hardness, as measured by the Vickers method, is in the range of 420 to 440. This is certainly hard for 0.14 per cent carbon steel. This structure has been termed martensite throughout this investigation although the microscope does not show it to be exactly the same in appearance as typical as-quenched martensite of ordinary heat-treating practice. This difference can possibly be attributed to the fact that this weld structure has been quenched from the molten state at a rate which is very much higher than that associated with ordinary heat treatment, and under a pressure of 1500 atmospheres.

The microstructures of specimens which have been welded and subsequently heat treated in the welding machine are more clearly defined, exhibit faster and darker etching characteristics and resemble closely the quenched and drawn structures which are obtained from ordinary heat-treating practice with this type of steel. The as-welded structure required an etching time of from 2 to 3 minutes with a 5 per cent picral solution, whereas the quenched and drawn structure required an etching time of 1 minute with the same solution.

0.070-Inch Material: For complete data, figures and results obtained during the investigation of the use of this type of spot welding for 0.070-inch gage N-A-X high-tensile steel, the reader is again referred to the before-mentioned publication appearing in the May, 1942, issue of *The Welding Journal*.

The investigation of the 0.070-inch material has more clearly defined and confirmed the general results obtained and so far discussed with respect to the 0.040-inch material. Of course, the electrode size, pressure, welding time, time interval between weld and heat treatment, time of heat treatment, welding amperage and heat-treating amperage are all expected to vary with variation in material thickness.

For the 0.070-inch material it was found that the critical minimum time interval which must be allowed between weld and heat treatment is about 32 cycles. It was again found that the ratio of U-strength to shear strength for welds which were heat treated after a time interval of less than 32 cycles was lower than the ratio obtained for welds receiving no heat treatment at all. The explanation for this is evidenced by a correlation of the hardness surveys across the weld structures, including the heat-affected zones and the parent metals.

Photoelastic studies have shown that in the U-type tensile testing of a spot weld the maximum stress concentration is located at the heat-zone to weld junction. For spot welds made by ordinary methods without subsequent heat treatment in plain low-carbon steel, there is very little hardness gradient between weld and heat-zone and between the heat-zone and parent metal. The entire structure is comparatively soft and ductile. These welds in plain low-carbon steels have high U-strength to shear-strength ratios. For welds made without subsequent heat treatment in high-tensile and hardenable steels, there exists a steep hardness gradient from parent metal to heat-zone with little hardness

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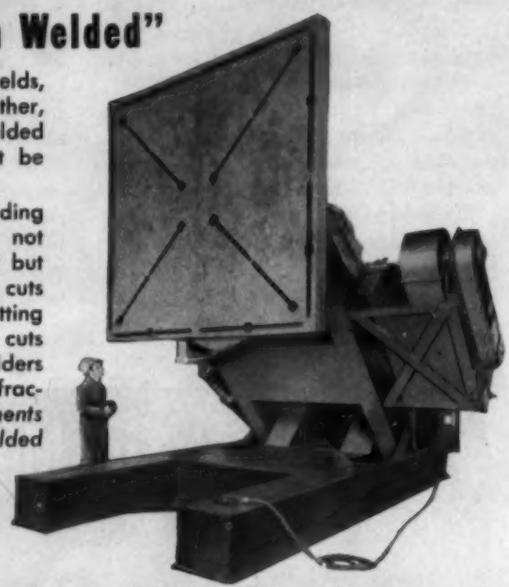

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gradient from heat-zone to weld. The weld and heat-zones may be very hard and brittle, but with little hardness gradient across their junction. They will exhibit comparatively low ultimate-strength-to-shear-strength ratios; however, much of the stress is probably concentrated at the parent metal to heat-zone junction as a result of the steep hardness gradient across this junction. This means that the stress concentration is divided between the parent metal to heat-zone junction and the heat-zone to weld junction. The first stress concentration is a result of hardness gradient, and the second stress concentration is a result of notch effect.

For welds made with heat treatment in high-tensile and hardenable steels, but in which the time interval between weld and heat treatment has not been long enough, the heat-zone is greatly softened and the weld remains very hard. This means that the entire stress concentration, resulting from notch effect and hardness gradient, acts on the heat-zone to weld junction. This junction is inherently sensitive to normal stress since it is the origin of the ingrowing dendrites. Thus, a weld heat treated without sufficient time interval between weld and heat treatment will have extremely low resistance to stresses which are normal to the welded surface and will snap apart in a very brittle fashion, and at low loads, in the U-type tensile test. These welds exhibit even lower ratios of U-strength to shear strength than welds made properly but with no subsequent heat treatment whatsoever.

When the weld is properly made and heat treated after sufficient time interval between weld and heat treatment, both the heat-zone and weld have been softened with little or no hardness gradient across their junction. These welds exhibit a ratio of ultimate strength to shear strength which is double the value obtained for welds given no subsequent heat treatment.

If the heat treatment rehardens the center of the weld, it will not appreciably lower the ultimate strength of the weld provided the rehardened area does not approach the heat-zone to weld junction. This junction is the all-important area, and heat-treatment should be directed at softening the heat-zone and the first 0.02 to 0.04-inch of the outside of the weld area, giving little or no hardness gradient across this junction.

The critical time interval between weld and heat treatment was found to be 32 cycles for the 0.070-inch material, as compared with 12 cycles for the 0.040-inch material. The difference is considerable; however, the values are in fair agreement with mathematical pre-

diction that the cooling rate of spot welds varies inversely as the square of the thickness.

In working with the 0.070-inch material, the effect of using refrigerated coolants was studied, with respect to lowering the time interval required between weld and heat treatment. During the entire investigation, the coolant temperature had been about 18 degrees Cent., and it was found that lowering this coolant temperature to 3 degrees Cent. decreased the time interval by only 2 to 3 cycles. This means that coolants would have to be refrigerated to extremely low temperatures in order to result in an appreciable saving in time, which means the occasional ill effects of water condensation and frosting on the electrode tips, plus the cost of refrigeration, would have to be balanced against the economies of a possible increase in production speed.

The optimum spot diameter for the 0.070-inch material was found to be about 0.310 to 0.320-inch. As in the case of the 0.040-inch material it was found that the advantages of heat treatment could be obtained in a few cycles heat-treating time. The optimum time for heat treatment, with respect to current flexibility and sufficient weld area softening, was found to be about 8 cycles for this 0.070-inch material. The optimum welding time for the 0.070-inch material was also 8 cycles.

Summary: Remarkable improvement in toughness of the spot welds in hardenable steels is possible by brief heat treatment in the spot-welding machine, following welding. This appears to open a new field of spot welding in those steels in which spot welds are ordinarily hard and brittle.

The mechanism of the toughening consists of allowing a drastic quench to martensite, followed immediately by a high draw at a temperature just below the critical.

A time of from 2 to 5 cycles is sufficient to secure the maximum benefit of post heat treatment in the gages and steel of this investigation.

Sufficient time must be allowed for the steel to cool to the martensite-forming temperature as otherwise the reheating accomplishes nothing. In order to reduce the time required for cooling, the weld should be made in the shortest possible time. This is due to the fact that the more rapidly the weld is heated and made, the less total heat is required and consequently the more rapid the cooling. This will permit reasonable total-weld plus heat-treatment time, and thus not tend to limit production speeds.

The heat-treating current must be carefully adjusted to raise the tempera-

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SPECIFICATION	MODEL A*	MODEL AX	MODEL AY
Capacity {At 5 ft. from front Axle / At 3¼ ft. from Bumper / At 10 ft. from front Axle}	5000 lbs. 2500 lbs.	10,000 lbs. 5,000 lbs.	20,000 lbs. 10,000 lbs.
Boom, Telescopic	12 to 18 ft. (a)	12 to 18 ft. (a)	12 to 18 ft. or 19 to 31 ft. (a)
Speed, Traveling {4 Speeds Fwd. / 1 Speed Rev.}	Up to 15 mi./hr. 2 mi./hr. (b)	Up to 12 mi./hr. 1¼ mi./hr. (b)	Up to 10 mi./hr. 1¼ mi./hr. (b)
Hoisting, Hook Speed {High Gear / Low Gear}	50 to 80 ft./min. 30-50 ft./min.	35-55 ft./min. 20-35 ft./min.	15-25 ft./min. 10-15 ft. min.
Boom Topping, Horiz. to Max. Vertical	8 Seconds	10 Seconds	12 Seconds
Boom Swing, 180 Degrees, High Gear	15 Seconds	20 Seconds	25 Seconds
Engine, For Travel & Crane	25-50 H-P Gasoline (a)	25-50 H-P Gasoline (c)	25-50 H-P Gasoline (c)
Width, over-all {Solid Tires / Pneumatic Tires}	5 ft. 6 in. 7 ft. 2 in. (d)	6 ft. 2 in. 8 ft. 5 in.	7 ft. 6 in. 9 ft. 3 in.
Length, (Exclusive of Boom) {Solid Tires / Pneumatic Tires}	10 ft. 8 in. 11 ft. 7 in. (d)	11 ft. 2 in. 12 ft. 5 in.	13 ft. 5 in. 14 ft. 8 in.
Height, over-all (with boom lowered) {Solid Tires / Pneumatic Tires}	7 ft. 0 in. 7 ft. 4 in. (d)	7 ft. 7 in. 7 ft. 11 in.	8 ft. 10 in. 9 ft. 5 in.
Weight, Complete with Std. Equipment	15,000 lbs.	21,000 lbs.	35,000 lbs.

*Production of Model A has decreased in favor of Model AX on which production has considerably increased. In line with WPB recommendations for a minimum of types, Model A may be discontinued for the Duration. Model AX should be considered instead.

(a) One piece booms and other boom lengths are also available, if required.

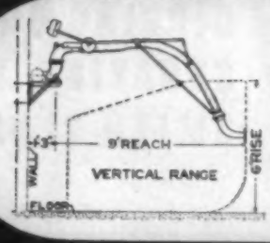
(b) An Auxiliary Reverse Transmission for high speed traveling in reverse, is available, if specified; provides all forward speeds also in reverse.

(c) Diesel Engine of same size is available, if specified.

(d) Pneumatic Tires used for Model A are NOT WPB Approved Standard Size; Model AX should therefore be considered instead.

Kranekar

SILENT HOIST WINCH & CRANE CO., 849 63RD ST., BROOKLYN, N.Y.



GUARD EMPLOYEE HEALTH by installing Ruemelin Fume Collectors wherever welding operations take place. They remove noxious gases, heat and smoke at the source . . . eliminate employee fatigue . . . speed up welding operations. Especially valuable in winter when doors and windows must be closed. Hundreds in operation all over the country. Write for bulletin No. 37-C.

RUEMELIN MFG. CO., 3882 N. Palmer St., Milwaukee, Wis.

RUEMELIN FUME COLLECTOR

ture as high as possible without reaching the critical transformation temperature.

The chisel test is a practical shop method of determining the proper magnitude of heat-treating current. Hardness tests at the center of weld cross sections for a series of welds with progressive variations in heat-treating current will select the best value with greater certainty.

With respect to the 0.070-inch material, lowering the coolant temperature from 18 to 3 degrees Cent. will reduce the time interval required between weld and heat treatment by only 2 to 3 cycles—from 32 cycles to about 30 cycles.

The general procedure and method used in this investigation could probably be used to improve greatly spot-weld quality in all types of low-alloy high-tensile high-carbon and deep-hardening alloy steels. It must be remembered, however, that all-steel characteristics with respect to chemistry, carbon content, amount of contained alloy, hardenability, S-curve characteristics and reactions to drawing temperatures and procedures will undoubtedly affect spot-welding variables such as time of weld, welding amperage, time interval between weld and heat treatment, time of heat treatment, heat-treating amperage and the extent of the critical range of these welding variables. The actual figures and data obtained for this N-A-X high-tensile steel will not necessarily be correct for other types of similar steel; however, the general method of post heat treatment in the welding machine shows great promise for future improvement of spot welds made in thin gages of hardenable steels.

Acknowledgments: The writer wishes to acknowledge the assistance and direction given during this investigation by Dr. W. F. Hess, director of the welding research laboratory of Rensselaer Polytechnic Institute, and co-author of the original reports and publications of this work, and of C. L. Altenburger, research engineer of the Great Lakes Steel Corp., Detroit. The writer also acknowledges the co-operation and assistance given by all members of the metallurgical and welding research staff of the Rensselaer Polytechnic Institute.

Tinless Bearing Metal To Save Much Tin

Some 5000 pounds of tin per month, it is reported, are being saved at Westinghouse plants by using bearings of tinless metal. Besides saving tin, bearing performance during tests lead engineers to believe they will be retained in industry even when tin becomes plentiful after the war.

The tinless metal developed by babbitt makers consists of approximately 80 per cent lead, 16 per cent antimony and about 4 per cent arsenic. In adapting regular bearing construction and technique to the new arsenic metals it was found that for most purposes the new bearings matched the performance of the old ones, are no more difficult to make; less expensive to build.

New Manual Discusses Wage Stabilization Act

A manual on how to apply the new Wage Stabilization act for employers, personnel directors and labor relations men was released recently by the Labor Relations Institute, 1775 Broadway, New York. Entitled "Practical Questions and Answers on Wage Stabilization", it is the second of a series of labor relations publications resulting from surveys on current employer-employe problems conducted by the institute's field staff.

The handbook contains a compilation of wage stabilization questions most troublesome to management executives, detailing what raises may be given as well as types of increases disallowed by the new orders. The report, which may be obtained without charge by writing to the institute, also lists such pertinent data as the names and addresses of regional directors of the War Labor Board and the function of the recently appointed tripartite panels.

Offers Acid-Resistant Fan for First Time

High temperature acid-resistant fans of alloy steel—used on its industrial furnaces and ovens for the past 7 years—now are being offered to the trade generally for the first time by Despatch Oven Co., Minneapolis. These are suited to virtually all heavy duty high-volume requirements involving temperatures to 1600 degrees Fahr. it is reported.

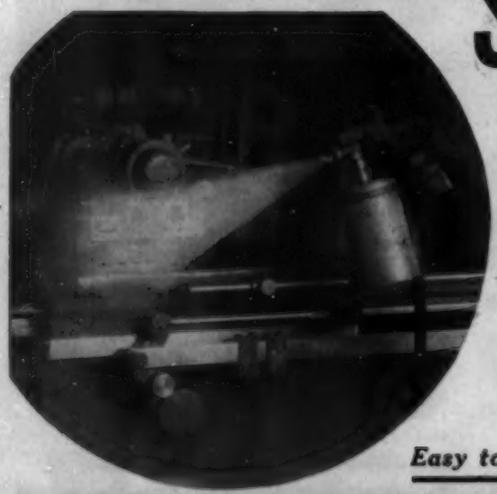
Eleven sizes are being offered, ranging from 12 to 48-inch diameter wheels. Belt-drive is used on all models, while wheel is overhung. Shaft is supported on two large bearings, which are air-cooled; a patented device dissipates heat from shaft before it reaches bearings.

Fans are of all-welded construction with various alloy steels being used to permit handling chemical gases, fumes, special atmospheres, vapors, foundry dust, furnace and oven heat circulation, pickling tank exhausts, etc. at high temperatures.

Substitutes Plastic On Spray Guns

Substitution of plastic bodies for aluminum on its spray guns is reported by Eclipse Air Brush Co. Inc., Newark, N. J. The plastic provides good chemical resistance and is not affected by thinners, solvents, paint removers, etc.; it is strong, having good impact strength, according to the company.

PREVENT RUST AND CORROSION WITH SMITH SLUSHOL



RUSTPROOF PARTS IN STOCK OR BEFORE SHIPMENT BY

BRUSHING, DIPPING OR SPRAYING WITH SMITH SLUSHOL

Easy to apply . . . Easy to remove

SMITH OIL & REFINING CO · Industrial Oils Div · 1108 Kilburn · ROCKFORD ILL

Definitely SUPERIOR!

HOT *and*
COLD ROLLED
STRIP STEEL
in
CARBON
and
ALLOY
ANALYSES
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"Borosil" Is New Alloy Used To Harden Steel

Adding to the list of alloys containing boron for use in addition to iron and steel, the Ohio Ferro Alloy Corp. is now producing and offering for sale an alloy known as "Borosil," containing 3 to 4 per cent boron, 40 to 50 per cent silicon and the balance, iron.

The boron content is reported to affect hardenability to a greater extent than any alloying element except carbon. The company also recommends the use of Borosil as a deoxidizer, with a wide application in the formation and distribution to inclusions to produce more uniform steels. The new alloy has a relatively low melting point and this, together with the low boron content, aids in a uniform recovery of the boron in the finished product.

GE Calculator Shows How To Save Copper

A handy slide rule calculator that shows at a glance how much copper can be saved in a war-plant electric power system by installing unit substations at centers of load areas is being offered gratis to those who request it by General Electric Co., Schenectady, N. Y.

Designated GES-3043, it shows amount of secondary-cable copper that is needlessly wasted when the unit substation is at varying distances from the load center. For example, the rule shows that about 12,700 pounds of copper are wasted when the substation is 1000 feet away.

Embodied on the reverse side of the rule is a chart showing per cent increase in cable copper as voltage is decreased, and another chart giving the cable needed to carry a 1000-kilovolt ampere load at various voltages over distances from 10 to 1000 feet.

Correction— NE Alloy Steels

In order to clear up any confusion caused by the transposition of several figure references in connection with the story "User Report No. 9 on Experience with NE Alloy Steels Type NE-9420", which appeared on p. 100 in the Feb. 1 issue, the editors wish the following to be noted:

In the fourth paragraph, page 103, third line, Fig. 5 should read Fig. 6. On page 134, the first column, last paragraph, Fig. 6 should read Fig. 7; in the second column, second paragraph, last line, Fig. 6 should read Fig. 7; second column, last paragraph, second line, Fig. 6 also should read Fig. 7; last column, third paragraph from bottom of page, Fig. 17 should read Fig. 8.

CONSERVE MAN-HOURS
EXPEDITE
PRODUCTION
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By Using Dependable
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The vital part that degreasing operations perform in war production derives from the fact that they importantly and directly influence subsequent operations such as anodizing, plating, tinning, black finishing, lacquering, painting, rust-proofing.

Because precision and speed in oil, grease and dirt removal, safety and economy in use are the major advantages that characterize Oakite degreasing materials, you will find them in the Nation's leading war plants successfully performing their specialized assignment in the production cycle . . . conserving man-hours, expediting work, reducing rejects, helping you meet contract requirements on time.

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Specialized cleaning
MATERIALS & METHODS FOR EVERY CLEANING REQUIREMENT

Cut Recruit Training Period of Your Screw Driver Army

ANYONE CAN DRIVE PHILLIPS SCREWS!

In many of today's war-expanded plants, *raw recruits* now literally walk from the employment office into responsible screw-driving jobs previously rated as skilled work. They produce efficiently, too, because the job is simplified and made foolproof by Phillips recessed head Screws.

The Phillips driver centers *automatically* in the recess . . . can't slip out to injure hands or spoil the work. This means centered *driving force* . . . no fumbling, wobbly starts . . . no slant-driven screws . . . no burred or broken screw heads.

Snug fit and perfect centering of driver in the Phillips Recess enable workers to make *uniformly tight* fastenings . . . and do it with *less effort.* Driving speed is often *doubled* because easy-driving, skid-proof Phillips recessed head Screws make power-driving practical!

They cost less to use! Compare the cost of driving Phillips and slotted head screws. You'll find that the price of screws is a minor item in your total fastening expense . . . that it actually costs less to have the many advantages of the Phillips Recess!

KEY TO FASTENING SPEED AND ECONOMY

The Phillips Recessed Head was scientifically engineered to afford:

Fast Starting – Driver point automatically centers in the recess . . . fits snugly. Screw and driver "become one unit." Fumbling, wobbly starts are eliminated.

Faster Driving – Spiral and power driving are made practical. Driver won't slip out of recess to injure workers or spoil material. (Average time saving is 50%.)

Easier Driving – Turning power is fully utilized by automatic centering of driver in screw head. Workers maintain speed without tiring.

Better Fastenings – Screws are set-up uniformly tight, without burring or breaking heads. A stronger, neater job results.

PHILLIPS *Recessed Head* SCREWS

WOOD SCREWS • MACHINE SCREWS • SELF-TAPPING SCREWS • STOVE BOLTS

21 SOURCES

American Screw Co., Providence, R. I.
The Bristol Co., Waterbury, Conn.
Central Screw Co., Chicago, Ill.
Chandler Products Corp., Cleveland, Ohio
Continental Screw Co., New Bedford, Mass.
The Corbin Screw Corp., New Britain, Conn.
The H. M. Harper Co., Chicago, Ill.
International Screw Co., Detroit, Mich.
The Lamson & Sessions Co., Cleveland, Ohio
The National Screw & Mfg. Co., Cleveland, Ohio
New England Screw Co., Keene, N. H.
The Chester Parker Co., Meriden, Conn.
Parker-Kalon Corp., New York, N. Y.
Pawtucket Screw Co., Pawtucket, R. I.
Russell Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Reading Screw Co., Norristown, Pa.
Pheoll Manufacturing Co., Chicago, Ill.
Scovill Manufacturing Co., Waterville, Conn.
Shakeproof Inc., Chicago, Ill.
The Southington Hardware Mfg. Co., Southington, Conn.
Whitney Screw Corp., Nashua, N. H.

Steel Output and Demand Are in Better Balance

DEMAND
Steady for all products.

PRODUCTION
Held at 98½ per cent.

PRICES
Unchanged at ceilings.

First steps in change to Controlled Materials Plan being taken. . . . Little change in deliveries. . . Pig iron situation easier. . . Labor shortage limits scrap supply

STEEL markets are fairly steady, demand and delivery showing little change with billets and large bar rounds tightest of all carbon steel products and shipments on alloy grades much more extended than carbon steels.

Application of the new Controlled Materials Plan is beginning to affect methods of applying for steel tonnage. Plate consumers have been advised that their PDX298 forms will apply to all requirements up to third quarter except for such orders as are covered by production authority allotments bearing numbers under CMP amendment No. 6. Beginning with applications for April rollings they are advised to discontinue the ten group classifications now used and instead to identify orders by appropriate CMP claimant agencies. They are advised to continue use of PD169 forms through second quarter but to place all CMP orders under amendment No. 6 first and follow in priority sequence orders for which form 298 has been filed.

Details of procedure governing PRP units in the period of transition to CMP in second quarter have been included in an amendment to the priorities regulations. This is to assure materials to manufacturers pending receipt of allotments under CMP by extension into second quarter of a basic percentage of first quarter authorizations.

• • •

On top ratings small and medium carbon bars, up to about 2-inch diameter, are available in five to seven weeks. Large rounds are difficult to obtain under 12 weeks and some producers have little to offer before third quarter. Hot-rolled sheets are available within five to six weeks and in some instances deliveries are even more extended, especially where plates are absorbing strip mill capacity. Cold-finished sheets can be promised in seven weeks and galvanized sheets by at least one maker can be promised in seven weeks, though this is better than the average. Shape deliveries are slightly easier with the average about six weeks, though some specifications could be promised in about four weeks.

Steelworks production last week continued at 98½ per cent of capacity, changes being fractional. Pittsburgh regained the ½-point lost the preceding week, to 97½ per cent, and St. Louis advanced 1 point to 93 per cent. Chicago lost another ½-point to 100 per cent because of repair necessity. Wheeling dropped 3 points to 79½ per cent, Buffalo 2½ points to 90½ and Cleveland ½-point to 91½. Rates were maintained without change at the following: Youngstown, 97; Cincinnati, 95; Detroit, 93; eastern Pennsylvania, 94; New England, 95; Birmingham, 100.

The situation in reinforcing bars continues unsatisfactory to steelmakers, WPB orders limiting production almost exclusively to rerolled rails, leaving a large tonnage of off-heat steel which could be utilized for this purpose instead of being remelted as scrap. Efforts to have this ruling changed are being continued, with little indication of success. The restriction has been broadened to include four Pacific Coast states formerly not covered.

• • •

While no new orders for domestic freight cars were placed in January a number of orders placed last year and frozen by WPB have been released. About 15,000 of the 20,000 to be built in first half have been released from the frozen orders.

Principal difficulty in the scrap market has shifted from material supply to manpower and the situation promises to become worse unless higher wages can be paid to restrain workers from changing to war work paying more.

Salvage sections of War Production Board are much encouraged at results obtained this winter, as enough scrap is being supplied to maintain steelmaking and most melters have been able to accumulate reserves for several weeks. In addition, yards still contain large accumulations from drives late last year, which have not yet been prepared for shipment. Borings and turnings still are a problem and opinion is divided on the effect of the recent shift in prices by Office of Price Administration, designed to move these grades more promptly.

Institute of Scrap Iron and Steel Inc. estimates scrap consumption in 1942 at 55,841,000 tons, 4 per cent over the previous high in 1941 and more than twice the greatest consumption in World War I.

Composite steel and iron prices are steady at levels maintained by ceiling prices of the Office of Price Administration. Finished steel holds at $56.73, semifinished steel at $36, steelmaking pig iron at $23.05 and steelmaking scrap at $19.17.

COMPOSITE MARKET AVERAGES

	Feb. 6	Jan. 30	Jan. 23	One Month Ago Jan., 1943	Three Months Ago Nov., 1942	One Year Ago Feb., 1942	Five Years Ago Feb., 1938
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$62.05
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	40.00
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	22.92
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	19.17	13.70

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material	Feb. 6, 1943	Jan. 1943	Nov. 1942	Feb. 1942
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.49	2.49	2.49	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.22	2.22	2.22	2.22
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pittsburgh	2.60	2.60	2.60	2.60
Tin plate, per base box, Pittsburgh	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55
Semifinished Material				
Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to 7/32-inch, Pittsburgh	2.00	2.00	2.00	2.00

Pig Iron	Feb. 6, 1943	Jan. 1943	Nov. 1942	Feb. 1942
Bessemer, del. Pittsburgh	$25.19	$25.19	$25.19	$25.19
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.39	25.39	25.39	25.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.30	24.30	24.30	24.06
No. 2X, del. Phila. (differ. av.)	26.265	26.265	26.265	26.215
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.54	31.54	31.54	31.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.19
Ferromanganese, del. Pittsburgh	140.65	140.65	140.65	125.33
Scrap				
Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.75	18.75
Heavy melting steel, Chicago	18.75	18.75	18.75	18.75
Rails for rolling, Chicago	22.25	22.25	22.25	22.25
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke				
Connellsville, furnace, ovens	$6.00	$6.00	$6.00	$6.00
Connellsville, foundry, ovens	7.25	7.25	7.25	7.25
Chicago, by-product fdry., del.	12.25	12.25	12.25	12.25

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to individual companies are noted in the table. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

Semifinished Steel

Gross ton basis except wire rods, skelp.

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh, uncropped, $45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.25; Duluth (bil.) $36.00.
(Andrews Steel Co., carbon slabs $41; Continental Steel Corp., billets $34, Kokomo, to Acme Steel Co.; Northwestern Steel & Wire Co. $41, Sterling, Ill.; Laclede Steel Co. $34, Alton or Madison, Ill.; Wheeling Steel Corp. $36 base, billets for lend-lease, $34, Portsmouth, O., on slabs on WPB directives.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.25; Duluth, $42.00.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34. (Wheeling Steel Corp. $37 on lend-lease sheet bars, $38 Portsmouth, O., on WPB directives; Empire Sheet & Tin Plate Co., Mansfield, O., carbon sheet bars, $39, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., $1.90.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.
Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10 Galveston, $0.27. Pacific Coast $0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.27c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.52c, all-rail 2.59c; Pac. ports, dock 2.50c; all rail 3.25c.
(Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points.) Joslyn Mfg. Co. may quote 2.35c, Chicago base. Calumet Steel Division, Borg Warner Corp., may quote 2.35c, Chicago base, on bars produced in its 8-inch mill.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c; Detroit, del., 2.82c.
(Texas Steel Co. may use Chicago base price as maximum f.o.b. Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

AISI Series	(*Basic O-H)	AISI Series	(*Basic O-H)
1300	$0.10	4100 (.15-.25 Mo)	0.55
		(.20-.30 Mo)	0.60
2300	1.70	4340	1.70
2500	2.55	4600	1.20
3000	0.50	4800	2.15
3100	0.70	5100	0.35
3200	1.35	5130 or 5152	0.45
3400	3.20	6120 or 6152	0.95
4000	0.45-0.55	6145 or 6150	1.20

*Add 0.25 for acid open-hearth; 0.50 electric.

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit, del. 3.47c.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.72c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.27c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.27c; Gulf ports, dock 2.52c, all-rail 2.61c; Pacific ports, dock 2.80c, all-rail 3.25c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.22c; Phila. del. 2.28c; New York del., 2.35c; Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.17c; New York del. 3.41c; Phila. del. 3.39c; Pacific ports 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.74c; Phila. del. 3.68c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c; zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage.

base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.22c; Pacific ports 2.75c. (Joslyn Mfg. Co. may quote 2.30c, Chicago base.)
Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.92c; Worcester base 3.00c.
Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.
Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.
Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.
Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.
Manufacturing Ternes: (Special Coated) Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.
Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.47c.
(Granite City Steel Co. may quote carbon plates 2.35c, f.o.b. mill. Central Iron & Steel Co. may quote plates at 2.20c, f.o.b. basing points.)
Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.72c; Pacific ports, 4.00c.
Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.
Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c; Phila., del., 2.22c; Gulf ports, 2.47c; Pacific ports, 2.75c.
(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points and 2.50c, Pheonixville, for export.)
Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Wire Products to the Trade:

Standard and cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	.67
Do., 11 gage and heavier	.70
Barbed wire, 80-rod spool, col.	.70
Twisted barbless wire, col.	.70
Single loop bale ties, col.	.59
Fence posts, carloads, col.	.69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

	Butt Weld Steel			Butt Weld Iron	
In.	Blk.	Galv.	In.	Blk.	Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	¾	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

	Lap Weld Steel		Lap Weld Iron	
In.	Blk.	Galv.	Blk.	Galv.
2	61	49½	23	3½
2½-3	64	52½	28½	10
3½-6	66	54½	30½	12
7-8	65	52½	31½	14½
9-10	64½	52	33½	18
11-12	63½	51	32½	17
			28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1⅝"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2¼"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2⅝"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.
Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.
*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.
Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.
High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base, per lb.
18.00	4	1	-	67.00c
1.5	4	1	8.5	54.00c
	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
CHROMIUM NICKEL STEEL					
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
311	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
*317	50.00	54.00	58.00	50.00	58.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50
STRAIGHT CHROMIUM STEEL					
403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00
STAINLESS CLAD STEEL (20%)					
304	.....	§§18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. §§Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.
Extras mean additions or deductions from base prices in effect April 16, 1941.
Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price, plus all-rail freight may be charged.
Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin.
Seconds, maximum prices: flat-rolled rejects 75% of prime prices; wasters 75%, waste-wasters 65%, except plates, which take waster prices; tin plate $2.80 per 100 lbs.; terne plate $2.25; semifinished 85% of primes; other grades limited to new material ceilings.
Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅝ and ⅜ x 6-in. and shorter	63½ off
Do., ⅝ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off
Step bolts	56 off
Plow bolts	65 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Nuts

Semifinished hex.	U.S.S.	S.A.E.
⅞-inch and less	62	64
⅛-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	64 off
Milled 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	71 off
Headless, ¼-in., larger	60 off
No. 10, smaller	70 off

Piling

Pittsburgh, Chicago, Buffalo	2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago, Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens	
Connellsville, furnace	*$6.00
Connellsville, foundry	7.00- 7.50
Connellsville prem. fdry.	7.25- 7.60
New River, foundry	8.00- 8.25
Wise county, foundry	7.50
Wise county, furnace	6.50
By-Product Foundry	
Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	†12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

*Operators of hand-drawn ovens using trucked coal may charge $6.50, effective Aug. 12, 1942. †$12.75 from other than Ala., Mo., Tenn.

Coke By-Products

Spot, gal., freight allowed east of Omaha	
Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do., less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls., to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.20

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face. Federal tax on freight charges, effective Dec. 1, 1942, not included in following prices.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.62	26.12	27.62	27.12
Brooklyn, N. Y., del.	27.69	.....	.....	28.15
Birdsboro, Pa., del.	25.00	24.50	26.00	25.50
Birmingham, base	†20.38	†19.00	.....	.....
Baltimore, del.	25.67	.....	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	‡24.47	.....	.....	.....
Cincinnati, del.	24.30	22.92	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del.	26.24	.....	.....	.....
Philadelphia, del.	25.51	25.01	.....	.....
St. Louis, del.	‡24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.17	24.67	25.67	25.17
Muskegon, Mich., del.	27.38	.....	.....	27.38
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.47	24.97	25.97	25.47
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.45	25.95	26.95	26.45
Duluth, base	24.50	24.00	25.00	24.50
St. Paul, del.	26.76	26.26	27.26	26.76
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.68	24.68	.....	25.35
Neville Island, Pa., base	24.00	23.50	24.50	24.00
‡Pittsburgh, del., No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	21.50	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	26.05	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.89	25.39	.....	26.39
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	26.06	25.56	26.56	26.06
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorus 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling irons, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn.	$28.00
Chicago, del.	31.54

Southern

Semi-cold blast, high phos., f.o.b. furnace, Lyles, Tenn.	$28.50
Semi-cold blast, low phos., f.o.b. furnace, Lyles, Tenn.	33.00

Gray Forge

Neville Island, Pa.	$23.50
Valley, base	23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorous Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable. Mystic Iron Works, Everett, Mass., may exceed basing point prices by $1 per ton, effective April 20, 1942. Chester, Pa., furnace of Pittsburgh Coke & Iron Co. may exceed basing point prices by $2.25 per ton, effective July 27, 1942.

Refractories

Refractories

Per 1000 f.o.b. Works, Net Prices	
Fire Clay Brick	
Super Quality	
Pa., Mo., Ky.	$64.50
First Quality	
Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00
Ohio	43.00
Second Quality	
Pa., Ill., Md., Mo., Ky.	46.85
Alabama, Georgia	38.00
New Jersey	49.00
Ohio	36.00
Malleable Bung Brick	
All bases	$59.85
Silica Brick	
Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30
Ladle Brick	
(Pa., O., W. Va., Mo.)	
Dry press	$31.00
Wire cut	29.00
Magnesite	
Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Basic Brick	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.	
Chrome brick	$34.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00
Fluorspar	

Fluorspar

Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$25.00-28.00
Do., barge	25.00-28.00
No. 2 lump	25.00-28.00

(Prices effective Nov. 23, 1942)

Ferroalloy Prices

Ferromanganese: 78-82%, carlots, gross ton, duty paid, Atlantic ports, $135; Del. Pittsburgh $140.65; f.o.b. Southern furnaces $135; Add $6 per gross ton for packed carloads $10 for ton, $13.50 for less-ton and $18 for less than 200-lb. lots, packed.

Spiegeleisen: 19-21%, carlots per gross ton, Palmerton, Pa. $36.

Electrolytic manganese: 99.9% plus, less ton lots, per lb. 42.00c. Ton lots 40.00c. Annual contracts 38.00c.

Chromium Metal: Per lb. contained chromium in gross ton lots, contract basis, freight allowed, 98% 80.00c, 88% 79.00c. Spot prices 5 cents per lb. higher.

Ferrocolumbium: 50-60%, per lb. contained columbium in gross ton lots, contract basis, f.o.b. Niagara Falls, N. Y. $2.25; less-ton lots $2.30. Spot prices 10 cents per lb. higher.

Ferrochrome: 66-70%; per lb. contained chromium in carloads, freight allowed, 4-6% carbon 13.00c; ton lots 13.75c; less-ton lots 14.00c; less than 200-lb. lots 14.25c. 66-72%, low carbon grades:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50c	20.25c	20.75c	21.00c
1% C.	20.50c	21.25c	21.75c	22.00c
0.20% C.	21.50c	22.25c	22.75c	23.00c
0.10% C.	22.50c	23.25c	23.75c	24.00c

Spot is ¼c higher

Chromium briquets: Contract basis in carloads per lb., freight allowed 8.25c; packed 8.50c; gross ton lots 8.75c; less-ton lots 9.00c; less 200-lb. lots 9.25c. Spot prices ¼-cent higher.

Ferromolybdenum: 55-75%, per lb. contained molybdenum, f.o.b. Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Calcium Molybdate (Molyte): 40-45%, per lb. contained molybdenum, contract basis, f.o.b. Langeloth and Washington, Pa., any quantity, 80.00c.

Molybdic Oxide Briquets: 48-52%, per lb. contained molybdenum, f.o.b. Langeloth, Pa., any quantity 80.00c.

Molybdenum Oxide: 53-63%, per lb. contained molybdenum in 5 and 20 lb. molybdenum contained cans, f.o.b. Langeloth and Washington, Pa., any quantity 80.00c.

Molybdenum Powder: 99% per lb. in 200-lb. kegs, f.o.b. York, Pa. $2.60; 100-200 lb. lots $2.75; under 100-lb. lots $3.00.

Ferrophosphorus: 17-19%, based on 18% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrophosphorus: 23-26%, based on 24% phosphorus content, with unitage of $3 for each 1% of phosphorus above or below the base; gross tons per carload f.o.b. sellers' works, with freight equalized with Mt. Pleasant, Tenn.; contract price $75, spot $80.

Ferrosilicon: Contract basis in gross tons per carload, bulk, freight allowed; unitage applies to each 1% silicon above or below base.

	Carloads	Ton lots
50%	$ 74.50	$ 87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

Spot prices ¼-cent higher.

Silicon Metal: Contract basis per lb., f.o.b. producers' plants, freight allowed; 1% iron; carlots 14.50c, ton lots 15.00c, less-ton lots 15.25c, less 200 lbs. 15.50c.

Silicon Metal: Contract basis per lb.; 2% iron; carlots 13.00c, ton lots 13.50c, less-ton lots 13.75c, less 200 lbs. 14.00c. Spot prices ¼-cent higher.

Silicon Briquets: Contract basis; in carloads, bulk freight allowed, per ton $74.50; packed $80.50; ton lots $84.50; less-ton lots per lb. 4.00c; less 200-lb. lots per lb. 4.25c. Spot ¼-cent per lb. higher on less-ton lots; $5 per ton higher on ton lots and over.

Silicomanganese: Contract basis freight allowed, 1½% carbon; in carloads per gross ton $135; ton lots $147.50. Spot $5 per ton higher.

Silico-manganese Briquets: Contract basis in carloads per pound, bulk freight allowed 5.80c; packed 6.05c; ton lots 6.30c; less-ton lots 6.55c; less 200-lb. lots 6.80c. Spot prices ¼-cent higher.

Ferrotungsten: Carlots, per lb. contained tungsten, $1.90.

Tungsten Metal Powder: 98-99%, per lb. any quantity $2.35-2.65.

Ferrotitanium: 40-45%, f.o.b. Niagara Falls, N. Y., per lb. contained titanium; ton lots $1.23; less-ton lots $1.25. Spot 5 cents per lb. higher.

Ferrotitanium: 20-25%, 0.10 maximum carbon; per lb. contained titanium; ton lots $1.35; less-ton lots $1.40. Spot 5 cents per lb. higher.

High-Carbon Ferrotitanium: 15-20%, Contract basis, per gross ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and North of Baltimore and St. Louis, 6-8% carbon $142.50; 3-5% carbon $157.50.

Ferrovanadium: 35-40%, contract basis, per lb. contained vanadium, f.o.b. producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Vanadium Pentoxide: Technical grade, 88-92 per cent V_2O_5; contracts, any quantity, $1.10 per pound V_2O_5 contained; spot 5 cents per pound higher.

Zirconium Alloys: 12-15%, contract basis, carloads bulk, per gross ton $102.50; packed $107.50; ton lots $108; less-ton lots $112.50. Spot $5 per ton higher.

Zirconium alloy: 35-40%, contract basis, carloads in bulk or package, per lb. of alloy 14.00c; gross ton lots 15.00c; less-ton lots 16.00c. Spot ¼-cent higher.

Alsifer: (Approx. 20% aluminum, 40% silicon, 40% iron) Contract basis, f.o.b. Niagara Falls, N. Y., per lb. 7.50c; ton lots 8.00c. Spot ¼-cent higher.

Simanal: (Approx. 20% each silicon, manganese, aluminum) Contract basis, freight allowed, per lb. of alloy; carlots 10.50c; ton lots 11.00c, less ton lots, 11.50c.

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1941

	Hot rolled bars	Structural shapes	Plates	Floor plates	Hot rolled sheets (10 gage base)	Hot rolled bands (12 gage and heavier)	Hot rolled hoops (14 gage and lighter)	Galvanized flat sheets (24 gage base)	Cold rolled sheets (17 gage base)	Cold finished bars	Cold-rolled strip	AISI hot bars 2300 series	AISI hot bars 3100 series
Boston	3.98[1]	3.85[1]	3.85[1]	5.66[1]	3.71[1]	4.06[1]	5.06[1]	5.11[14]	4.68[24]	4.13[28]	3.46	7.75[30]	6.05[30]
New York	3.84[1]	3.75[1]	3.76[1]	5.56[1]	3.58[1]	3.96[1]	3.96[1]	5.00[13]	4.60[1]	4.09[21]	3.51	7.60[30]	5.90[30]
Philadelphia	3.85[1]	3.55[1]	3.55[1]	5.25[1]	3.55[1]	3.95[1]	4.45[1]	4.90[16]	4.63[26]	4.06[21]	3.31	7.56[30]	5.86[30]
Baltimore (city)	3.85[1]	3.70[1]	3.70[1]	5.25[1]	3.50[1]	4.00[1]	4.35[1]	5.05[17]	5.00[26]	4.04[21]	....	....	....
Baltimore (country)	3.85[1]	3.70[1]	3.45[1]	5.25[1]	3.25[1]	4.00[1]	4.35[1]	4.75[17]	5.00[26]	4.04[21]	....	....	....
Washington, D. C.	3.95[1]	3.80[1]	3.80[1]	5.35[1]	3.60[1]	4.10[1]	4.45[1]	5.15[17]	5.10[26]	4.03[21]	....	....	....
Norfolk, Va.	4.00[1]	4.05[1]	4.05[1]	5.45[1]	3.85[1]	4.10[1]	4.10[1]	5.40[17]	4.50[24]	4.15[21]	....	....	....
Bethlehem, Pa.*	3.45[1]	....	....	....	....	....	....	....	....	....	....	....	....
Claymont, Del.*	....	....	3.45[1]	....	....	....	....	....	....	....	....	....	....
Coatesville, Pa.*	....	....	3.45[1]	....	....	....	....	....	....	....	....	....	....
Buffalo (city)	3.35[1]	3.40[1]	3.62[1]	5.25[1]	3.25[1]	3.82[1]	3.82[1]	4.75[15]	4.30[13]	3.75[21]	3.52	7.35[30]	5.65[30]
Buffalo (country)	3.25[1]	3.30[1]	3.62[1]	5.25[1]	3.15[1]	3.82[1]	3.82[1]	4.65[15]	4.20[13]	3.65[21]	....	....	....
Pittsburgh (city)	3.35[1]	3.40[1]	3.40[1]	5.00[1]	3.35[1]	3.60[1]	3.60[1]	4.75[13]	4.00[24]	3.65[21]	....	7.45[30]	5.75[30]
Pittsburgh (country)	3.25[1]	3.30[1]	3.30[1]	4.90[1]	3.25[1]	3.50[1]	3.50[1]	4.65[13]	4.00[26]	3.65[21]	....	....	....
Cleveland (city)	3.25[1]	3.58[1]	3.40[1]	5.18[1]	3.35[1]	3.50[1]	3.50[1]	4.62[12]	4.05[26]	3.75[21]	3.20	7.55[30]	5.85[30]
Cleveland (country)	3.25[1]	3.58[1]	3.30[1]	5.18[1]	3.25[1]	3.50[1]	3.50[1]	4.62[12]	3.95[26]	3.65[21]	....	....	....
Detroit	3.43[1]	3.65[1]	3.60[1]	5.27[1]	3.43[1]	3.43[1]	3.68[1]	4.84[12]	4.30[26]	3.80[21]	3.40	7.67[30]	5.97[30]
Omaha (city)	4.10[1]	4.15[1]	4.15[1]	5.75[1]	3.85[1]	4.20[1]	4.20[1]	5.52[10]	4.77[24]	4.42[21]	....	....	....
Omaha (country)	4.00[1]	4.05[1]	4.05[1]	5.65[1]	3.75[1]	4.10[1]	4.10[1]	5.52[10]	4.77[24]	4.42[21]	....	....	....
Cincinnati	3.60[1]	3.68[1]	3.65[1]	5.28[1]	3.42[1]	3.67[1]	3.67[1]	4.92[10]	4.37[24]	4.00[21]	3.45	7.69[30]	5.99[30]
Youngstown, O.*	....	....	....	....	....	....	....	4.40[12]	....	....	....	....	....
Middletown, O.*	....	....	....	....	3.25[1]	3.50[1]	3.50[1]	4.40[12]	....	....	....	....	....
Chicago (city)	3.50[1]	3.55[1]	3.55[1]	5.15[1]	3.25[1]	3.60[1]	3.60[1]	4.85[10]	4.10[24]	3.75[21]	3.50	7.35[30]	5.65[30]
Chicago (country)	3.40[1]	3.45[1]	3.45[1]	5.05[1]	3.15[1]	3.50[1]	3.50[1]	4.75[10]	4.00[24]	3.65[21]	....	....	....
Milwaukee	3.63[1]	3.68[1]	3.68[1]	5.28[1]	3.38[1]	3.73[1]	3.73[1]	4.98[10]	4.23[24]	3.88[21]	3.54	7.33[30]	5.88[30]
St. Paul	3.75[3]	3.80[3]	3.80[3]	5.40[3]	3.50[3]	3.85[3]	3.85[3]	5.00[3]	4.35[3]	4.34[21]	3.83	7.70[30]	6.00[30]
St. Louis	3.64[1]	3.69[1]	3.69[1]	5.29[1]	3.39[1]	3.74[1]	3.74[1]	4.99[10]	4.24[24]	4.02[26]	3.61	7.72[30]	6.02[30]
Indianapolis (city)	3.60[1]	3.70[1]	3.70[1]	5.30[1]	3.45[1]	3.75[1]	3.75[1]	5.01[10]	4.25[24]	3.97[21]	....	....	....
Indianapolis (country)	3.35[1]	3.45[1]	3.40[1]	5.05[1]	3.20[1]	3.50[1]	3.50[1]	5.01[10]	4.00[24]	3.97[21]	....	....	....
Memphis, Tenn.	3.90[3]	3.95[3]	3.95[3]	5.71[3]	3.85[3]	4.10[3]	4.10[3]	5.25[11]	4.66[24]	4.31[21]	....	....	....
Birmingham (city)	3.50[3]	3.55[3]	3.55[3]	5.83[3]	3.45[3]	3.70[3]	3.70[3]	4.75[15]	4.78[24]	4.43[21]	....	....	....
Birmingham (country)	3.40[3]	3.45[3]	3.45[3]	5.83[3]	3.35[3]	3.60[3]	3.60[3]	4.75[15]	4.78[24]	4.43[21]	....	....	....
New Orleans (city)	4.10[4]	3.90[4]	3.90[4]	5.85[4]	3.95[4]	4.20[4]	4.20[4]	5.25[26]	4.95[10]	4.60[21]	5.00	....	....
New Orleans (country)	4.00[4]	3.80[4]	3.80[4]	5.75[4]	3.85[4]	4.10[4]	4.10[4]	5.15[26]	4.95[10]	4.60[21]	....	....	....
Houston, Tex.	3.75[3]	4.25[3]	4.25[3]	5.50[3]	3.75[3]	4.30[3]	4.30[3]	5.25[26]	5.43[10]	4.50[23]	....	....	....
Los Angeles	4.35[4]	4.60[4]	4.90[4]	7.15[4]	4.95[4]	4.90[4]	6.70[4]	5.95[28]	7.15[5]	5.70[29]	....	9.55[30]	8.55[30]
San Francisco (city)	3.95[7]	4.35[7]	4.65[7]	6.35[7]	4.55[7]	4.50[7]	4.50[7]	6.60[29]	7.55[10]	5.55[29]	....	9.80[5]	8.80[5]
San Francisco (country)	3.85[7]	4.25[7]	4.55[7]	6.25[7]	4.45[7]	4.40[7]	4.40[7]	6.50[29]	7.45[10]	5.45[29]	....	....	....
Tacoma	4.20[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.25[6]	5.45[6]	5.70[6]	6.63[26]	5.75[29]	....	....	....
Seattle (city)	4.20[6]	4.45[6]	4.75[6]	6.50[6]	4.65[6]	4.35[6]	5.45[6]	5.70[6]	6.63[26]	5.75[29]	....	....	8.00[5]

*Basing point cities against which warehouses equalized freight as of April 16, 1941, and which must now be used in calculating lowest combination prices.

NOTE—All prices except cold-rolled strip and AISI hot-rolled bars fixed by Office of Price Administration in amendment No. 10 to Revised Price Schedule No. 49.

BASE QUANTITIES

[1]—400 to 1999 pounds; [2]—400 to 14,999 pounds; [3]—any quantity; [4]—300 to 1999 pounds; [5]—400 to 3999 pounds; [6]—300 to 1999 pounds; [7]—400 to 39,999 pounds; [8]—under 2000 pounds; [9]—under 4000 pounds; [10]—500 to 1499 pounds; [11]—one bundle to 39,999 pounds; [12]—150 to 2249 pounds; [13]—150 to 1499 pounds; [14]—three to 24 bundles; [15]—450 to 1499 pounds; [16]—one bundle to 1499 pounds; [17]—one to nine bundles; [20]—one to six bundles; [23]—100 to 749 pounds; [26]—300 to 1999 pounds; [27]—1500 to 39,999 pounds; [28]—1500 to 1999 pounds; [29]—1000 to 39,999 pounds; [24]—400 to 1499 pounds; [30]—1000 to 1999 pounds; [31]—under 25 bundles. Cold-rolled strip, any quantity is base.

Ores

Lake Superior Iron Ore
Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore
Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	13.00

Foreign Ore
Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% f.o.b. Rio de Janeiro	7.50-8.00c

Tungsten Ore

Chinese wolframite, per short ton unit, duty paid	$24.00

Chrome Ore
(Equivalent OPA schedules):
Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Ore., or Tacoma, Wash.
(S/S paying for discharging; dry basis; subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	41.00
48% 3:1	43.50
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	27.40
45% no ratio	28.30
48% no ratio	31.00
50% no ratio	32.80
Brazilian—nominal	
44% 2.5:1 lump	33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	28.30
48% no ratio	31.00
48% 3:1 lump	43.50
Domestic (f.o.b. Columbus, Mont.)	
48% 3:1	43.50

less $7 freight allowance

Manganese Ore
Including war risk but not duty, cents per gross-ton unit, dry, f.o.b. cars, New Orleans and Mobile; 5 cents higher at Norfolk, Baltimore, Philadelphia, New York; adjustments for analysis variations. (Based on OPA schedules.)

Brazilian, 48%	73.8c
Brazilian, 46%	71.8c
Caucasian, 51%	75.5c
Caucasian, 50%	74.8c
Chilean, 48%	73.8c
Indian, 50%	74.8c
Indian, 48%	73.8c
South African, 48%	73.8c
South African, 46%	71.8c
(Duty Free)	
Cuban, 51%	86.8c
Cuban, 48%	85.0c
Cuban, 45%	82.0c
Philippine, 50%	85.0c
Domestic, 48%, f.o.b. mines	96.0c

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

NATIONAL EMERGENCY STEELS (Hot Rolled)

Extras for Alloy Content

Designation	Carbon	Mn.	Si.	Cr.	Ni.	Mo.	Basic open-hearth Bars per 100 lb.	Basic open-hearth Billets per G T	Electric furnace Bars per 100 lb.	Electric furnace Billets per G T
	Chemical Composition Limits, Per Cent									
NE 1330	.28-.33	1.60-1.90	.20-.35	.....	.....	.....	$ .10	$2.00	....	....
NE 8020	.18-.23	1.00-1.30	.20-.35	.....	.....	.10-.20	.45	9.00	$.95	$19.00
NE 8442	.40-.45	1.30-1.60	.20-.35	.....	.....	.30-.40	.90	18.00	1.40	28.00
NE 8618	.13-.17	.70- .90	.20-.35	.40-.60	.40-.70	.15-.25	.75	15.00	1.25	25.00
NE 8720	.13-.18	.70- .90	.20-.35	.40-.60	.40-.70	.20-.30	.80	16.00	1.30	26.00
NE 9253	.50-.60	.75-1.00	1.80-2.20	.....	.....	.....	.40	8.00	....	....
NE 9262	.55-.65	.75-1.00	1.80-2.20	.20-.40	.....	.....	.65	13.00	....	....
NE 9415	.13-.18	.80-1.10	.40-.60	.20-.40	.20-.50	.08-.15	.80	16.00	1.30	26.00
NE 9442	.40-.45	1.00-1.30	.40-.60	.20-.40	.20-.50	.08-.15	.85	17.00	1.35	27.00
NE 9587	.35-.40	1.20-1.50	.40-.60	.40-.60	.40-.70	.15-.25	1.20	24.00	1.70	34.00
NE 9630	.28-.33	1.20-1.50	.40-.60	.40-.60	.....	.....	.80	16.00	1.30	26.00
NE 9642	.40-.45	1.30-1.60	.40-.60	.40-.60	.....	.....	.85	17.00	1.35	27.00

Extras are in addition to a base price of 2.70c, per 100 lb., on finished products and $54 per gross ton on semifinished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semifinished. No prices quoted on vanadium alloy.

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

	ELECTRIC FURNACE, ACID OPEN-HEARTH AND FOUNDRY GRADES													
					Low Phos. Grades									
	OPEN HEARTH GRADES*	Mixed Bor., Turn., Machine Turnings	Cast Iron Borings	Shoveling Turnings	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	Heavy Structural, Plate 3 ft. and less	Heavy Structural, Plate 2 ft. and less	Heavy Structural, Plate 1 ft. and less	Foundry Steel 2 ft. and less	Foundry Steel 1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$15.00	$16.00	$17.00	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Bethlehem	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Buffalo	19.25	14.25	15.25	16.25	24.25	21.75	20.75	21.25	21.75	20.75	21.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	14.50	15.50	16.50	24.50	22.00	21.00	21.50	22.00	21.00	21.50	17.50	19.00	20.50
Detroit	17.85	12.85	13.85	14.85	22.85	20.35	19.35	19.85	20.35	19.35	19.85	15.85	17.35	18.85
Toledo	†15.35	12.85	13.85	14.85	....	....	....	....	....	....	....	....	....	....
Chicago	18.75	13.75	14.75	15.75	23.75	21.25	20.25	20.75	21.25	20.25	20.75	16.75	18.25	19.75
Kokomo	18.25	13.25	14.25	15.25	23.25	20.75	19.75	20.25	20.75	19.75	20.25	16.25	17.75	19.25
Duluth	18.00	13.00	14.00	15.00	23.00	20.50	19.50	20.00	20.50	19.50	20.00	16.00	17.50	19.00
St. Louis	17.50	12.50	13.50	14.50	22.50	20.00	19.00	19.50	20.00	19.00	19.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	12.00	13.00	14.00	22.00	19.50	18.50	19.00	19.50	18.50	19.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	12.50	13.50	21.50	19.00	18.00	18.50	19.00	18.00	18.50	14.50	16.00	17.50
Seattle	14.50	9.50	10.50	11.50	19.50	17.00	16.00	16.50	17.00	16.00	16.50	12.50	14.00	15.50

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails 3 ft. and under	Scrap Rails 2 ft. and under	Scrap Rails 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	$21.00	$22.00	$23.50	$24.00	$24.25	$24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	15.50	16.50	17.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

*Open Hearth Grades refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. No. 1 chem. borings, 1 per cent oil, $1 under, No. 2, 1.5 per cent oil, $2 under heavy melting steel. No. 3 bundles, $2 under No. 1 heavy melting; cast steel, $2.50 over, No. 2 busheling, $2.50 under No. 1 heavy melting steel, auto springs, crankshafts, $1 over No. 1 heavy melting. †Toledo open-hearth grades cover only No. 2 busheling.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. Commissions must be shown as separate item on invoice.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.65 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 (plus freight rate increase March 18, 1942) the prices listed in the table for the nearest basing point. Certain exceptions specified in Revised Price Schedule No. 4 (Amendment 1) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan; to shipments of turnings to ferroalloy producers and of borings to chemical users. Delivered prices of scrap shipped under WPB allocations may exceed prices at nearest basing point by more than $1, if most economical transportation is used.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $3.50 less; (material from which Nos. 1, 2 and 3 bundles made is $4 less) than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the 'corresponding grades of prepared scrap."

Remote Scrap: Consists of all grades, except railroad scrap, in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon, Washington, Louisiana, Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price. Colorado scrap is remote scrap for Colorado consumers only.

Sheets, Strip . . .

Sheet & Strip Prices, Page 128

Steel sheet requirements are more diversified, increasingly so under the influence of somewhat uneven flow of war contracts. Aggregate demand is somewhat lower, with fabricators of finished products who normally take the larger tonnages curtailed and restricted. Shops usually fabricating 275-gallon household tanks of pickled hot-rolled material have converted to special work, each contract being in effect an engineering job. Production of household tanks has halted and new contracts handled by these shops require less sheets but more diversified specifications. Demand for stoves and drums is also off.

Deliveries of hot-rolled sheets against warehouse allocations are heavier, some jobbers holding up shipments to keep within quotas. Several mills are soliciting cold-rolled tonnage, promising a shade better delivery than on hot-finished material. Easiness in sheets is indicated by difficulty in diverting some attractive tonnage rejected for minor off-specification. Requirements for some ordnance contracts have been reduced as inventories are lined up for application of CMP. Shipments of galvanized sheets are confined mostly to jobber directives and are slightly heavier, although shipments are under full quotas.

Purchase orders covering 300,000 fifty-five gallon, 18-gage steel drums to be used to transport fuel oil and kerosene in freight cars from the Gulf coast to the Atlantic seaboard, have been placed by Defense Plant Corp. The purchase was made on recommendation of the War Production Board and the petroleum administrator for war.

Following suspensions a few weeks ago orders for airfield landing mats are being reinstated. Tonnage appears somewhat smaller than formerly and deliveries cover a longer period, thus interfering less with other production. In the case of one mill reinstated tonnage covers the remainder of this year, compared with a few months on the same tonnage before suspension.

Hot-rolled sheets can be promised in six to seven weeks, with cold-rolled a little more extended, at seven to eight weeks, with little available for the remainder of this quarter.

Narrow cold strip shipments are in excess of new orders and also directives with some rerollers; buying has declined, which, coupled with reduced releases for cartridge clip steel, results in some minor revisions in production and delivery schedules. While backlogs on some items are reduced slightly, tonnage scheduled to be shipped after the first quarter is heavy, some of which is likely to be increasingly affected by application of CMP to more consumers. Production during the next few weeks will be closely geared to hot strip allocations to rerollers, and, in some instances where shipments have been in excess of directive tonnage, operations may be expected to be curtailed slightly to around 70 per cent of capacity, unless quotas are revised upward.

Plates . . .

Plate Prices, Page 129

Deliveries of steel plates to shipyards will be heavier during the balance of the quarter, to meet expanding schedules at several yards, notably for escort ships. Demand for more tonnage is filtering through to shops under subcontract to shipbuilders. Under directives, warehouses are scheduled to get slightly better tonnage this month. Several fabricators of small tanks, 550 and 1000-gallon, are fabricating more 3/16-inch material.

Heavy demand prevails for floor plates, especially lighter gages, with shipyards accounting for most tonnage, although miscellaneous buying is substantial. Floor plates, under allocation, are available in six to eight weeks down to AA-3, but few producers can promise definite shipment below that rating. Inventories of floor plates are relatively much lower than sheared and universal material. Warehouses are turning over deliveries as fast as received, although direct mill buying is well above normal. Split deliveries are frequent.

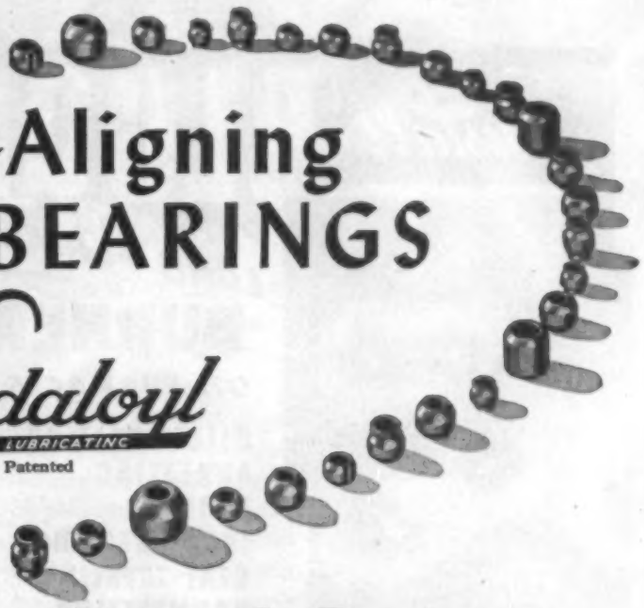
Bars . . .

Bar Prices, Page 128

Bar schedules show little change, with small rounds and flats available within five to six weeks on AA-1 and AA-2 ratings, and occasionally, although the exception, on AA-3 ratings. Large rounds and flats, apart from directives, cannot be had much before the middle of next quarter, and there are some producers who have little to offer before third quarter.

Of course, in view of directives,

for Self-Aligning BEARINGS



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When you want self-aligning bearings that are low in cost, yet tops in performance . . . specify JOHNSON LEDALOYL. This new development in powder metallurgy provides all the excellent bearing qualities of cast bronze but eliminates the expense of machining. In addition, LEDALOYL holds up to 35% oil by volume, thus assuring the right amount of lubrication in the right place, at the right time.

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SLEEVE BEARING HEADQUARTERS
550 S. MILL STREET NEW CASTLE, PA.

especially those that provide hot bars for cold drawers and warehouses, it is difficult for any hot bar producer to quote definite deliveries on purely rated tonnage.

Alloy deliveries are as extended as ever, most volume covered by directives, with aircraft demand heavy. Forging shops, heavily engaged on aircraft contracts, are operating at least 75 per cent on alloys. Forge shops among the first to get on all-out war schedules, have tonnage with mills for what amount to duration contracts with heavy releases each month, although some changes in specifications involving NE steels have been made.

In New England the impact of war has influenced demand for bars, both in volume and finish, more than other steel products. Prewar demand was close to 60 per cent cold bessemer screw stock, mostly small sizes, but war requirements have reversed the ratio to open-hearth and electric furnace steel, heavier stock.

In spite of increased quotas for farm machinery builders, through allocation of 50,000 tons of bessemer or rerolled rail steel, manufacturers are not satisfied with first quarter quotas. Farm machinery to be available for use in 1943 crop production must be manufactured early in the year or be too late for effective use.

Pipe . . .

Pipe Prices, Page 129

Demand for merchant steel pipe has slackened at a time when deliveries to distributors are improving; while there is some unbalance as to sizes, a more substantial part of quotas is being met, notably butt-weld, in addition to directive tonnage. Lap-weld is tighter than butt-weld, but direct mill shipments are declining.

Engineering contractors have placed some fair orders with district sales offices for delivery at various points, covering rubber plants and engineering projects for which they hold the general contracts. An important change in procurement involves the purchase of steel pipe for some services at Chicago instead of a Rhode Island naval depot as heretofore. Little seamless tubing is available outside of directives, aircraft absorbing a considerable part of the output with more welded structural tubing entering some phases of the air program. For many uses steel continues to replace brass.

Reused iron and steel pipe prices have been revised, providing a uniform price of $35 per net ton for used structural pipe, with extra service charges. Reusable galvanized pipe has been advanced from the black pipe level to 20 per cent higher for 1 inch and smaller and 15 per cent higher on larger sizes. The amendment sets specific maximums on several standard sizes of reusable pipe not included in the original regulation.

Pipe production for the "big inch" oil pipeline from Texas to the east coast is making a new record with an average of 5.8 miles per day. Up to Jan. 21 deliveries had totaled 1894 carloads.

Wire . . .

Wire Prices, Page 129

Revision in directive quotas, an increase in some departments and a decrease in others better to meet pressure for war demand, is asked by some wire mills. Concentrated buying centers in fine wire specialties and on some heavy products. While orders are down slightly, incoming volume in some departments is in excess of shipments. Annealing equipment is heavily taxed and is a capacity limitation on considerable tonnage. Long processing is required for a substantial part of the tonnage being produced by mills and usual measuring standards as to aggregate mill capacity are uncertain.

Some departments are filled with duration contracts against which releases each month are steady, while others are down or on reduced schedules, low carbon flats for instance. Pressure for bullet core steel, aircraft alloys, rope wire, and lend-lease continues heavy. Under directives rods are better distributed to mills producing high-rated or directive war tonnage.

Rails, Cars . . .

Track Material Prices, Page 129

Further releases against the 20,000 freight cars to be built for domestic account in the first half have, it is estimated, brought the total up to around 15,000, including 4585 previously noted as having been approved for construction by the railroads in their own shops. The latter number includes the 1000 heavy duty gondola cars noted in the last week's issue as approved for construction by the Pennsylvania railroad. No further cars will be released for railroad shop

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construction under the 20,000-car program.

No domestic freight were placed last month, comparing with 4253 in January last year, 15,169 in January, 1941, and 360 in January, 1940.

Further comparisons follow:

	1943	1942	1941	1940
Jan.	0	4,253	15,169	360
Feb.		11,725	5,508	1,147
March		4,080	8,074	3,104
April		2,125	14,645	2,077
May		822	18,630	2,010
June		0	32,749	7,475
July		1,025	6,459	5,846
Aug.		0	2,668	7,525
Sept.		1,863	4,470	9,735
Oct.		0	2,499	12,195
Nov.		0	2,222	8,234
Dec.		135	8,406	7,181
Total		26,028	121,499	66,889

Among recent car lists approved for construction under the 20,000 car program and not representing new orders are 300 fifty-ton flat cars for the Northern Pacific, placed with the American Car & Foundry Co., New York, and 200 seventy-ton gondola cars for the Atchison, Topeka & Santa Fe, placed with the Pullman-Standard Car Mfg. Co., Chicago. The Chicago & Northwestern is reported in the market for 250 seventy-ton ore cars.

The War Production Board has authorized the American Locomotive Co., New York, to build the ten 4-8-4 type freight locomotives, which the Nashville, Chattanooga & St. Louis placed last fall.

Structural Shapes . . .

Structural Shape Prices, Page 129

Some easing of restrictions on the use of fabricated structural steel is looked for by third quarter; meanwhile current inquiry is light and on the limited volume of tonnage figured quotations average close to 10 per cent lower than during the peak of demand for the nation's industrial war plant, which is estimated to have taken approximately 4,000,000 tons. Most current production of structural mills is going to shipyards, and, while one is operating near capacity, operations for the industry are not much better than 60 to 65 per cent, with some units engaged on heavy rounds.

Deliveries on plain material range from six to eight weeks and inventories with shipbuilders are in better balance and heavier. Fabricating shop backlogs are rapidly disappearing and some are now engaged primarily on miscellaneous subcontracting for ships. Much of this work is of a special engineering type, requiring less steel than normal construction; welding equipment is utilized largely.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 129

Despite considerable effort on the part of rail bar mills, new billet mills and reinforcing bar fabricators, these bars have not been transferred to group 3 by the conservation division. Some effort still is being made in this direction, but such a change does not now appear imminent.

Emphasis continues to be placed on substitution of other materials, such as mass concrete, wood reinforced concrete and all wood construction, suitably treated to make it fire resistent, rather than increased use of bars for reinforcing.

New business is light. Virtually all orders are small and are being placed with rerolling mills. The situation as regards available steel for concrete bar rolling remains unchanged. There is an ample supply of rails for rerolling and a more than ample supply of off-heat steel for rolling into new billet bars. The scrap situation is adequate so that it would not be necessary from the scrap standpoint to use all off-heat material for remelting purposes.

Recent order by WPB concentrating production of concrete reinforcing bars in rerolling mills has been extended to cover California, Oregon and Washington, previously exempted because such capacity was small in those states. The order also allows two steel mills, one in California and one in Oklahoma, whose output always has been largely reinforcing bars, to continue their production.

Pig Iron . . .

Pig Iron Prices, Page 130

Pig iron supply is definitely easier at the moment and is meeting all essential needs. While requests for March shipments showed little change in tonnage some foundries are curtailing operations from a number of causes. Some difficulty has been met in maintaining sufficient workers to keep up production, losses to the armed forces and to other war work paying higher wages having depleted available labor. In some instances priority ratings as low as A-10 are said to be sufficient to obtain iron.

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FOR AIR AND AIRLESS
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SPEED IS VITAL IN BLAST CLEANING. Speed in solving cleaning room problems—and speed in producing finished work.

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For more than a third of a century—through two world wars—Pangborn equipment has grown—step by step—with our customers. Concerns that were small twenty-five to thirty years ago are now the nation's great metal plants and war production units. We served them "then" —and we continue to serve their greatly magnified needs today. Simply because *our* cleaning and dust control equipment has grown and expanded with *their* growth and expansion.

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PANGBORN CORPORATION . . . HAGERSTOWN, MARYLAND

Some jobbing foundries note a decline in orders, in some cases for machine tool castings. Pipe foundries also are curtailing operations under restrictions on use of cast iron pipe. Some of the latter maintain production by essential war work they have been able to obtain.

Easing of limitations on agricultural implement production this year is expected to increase demand for iron to make castings for this purpose after the severe restrictions that have been in effect. Stove foundries are expected to require more iron to meet their enlarged output.

Allocations of basic pig iron from the Buffalo district for New England are somewhat heavier, representing slight changes in distribution rather than increase in demand. Delivery schedules on this grade are subject to minor revisions, partially due to the fact requirements are shipped on a monthly basis under allocations whereas melters normally stock heavily for consumption in winter months. Foundry demand is easing moderately with some less pressure for deliveries, inventories averaging about 30 days.

Scrap . . .

Scrap Prices, Page 132

Improved conditions in steel and iron scrap supply are such that salvage departments of the War Production Board show much optimism for the immediate future. Sufficient scrap has been provided to prevent any shutdowns of open-hearth furnaces during the past six months. Inventories of steelmakers have been increased in spite of bad weather conditions and lack of manpower through the winter. Preparation of the large accumulations from the general scrap drive last fall has been going forward as rapidly as possible but considerable of this material still is in yards, awaiting processing.

The most serious obstacle at present seems to be the labor situation, as it is difficult to hold workers against the better wages paid in other war work. In an effort to better this situation dealers in the Chicago area have asked the manpower commission for permission to increase wages from the frozen level of 60 cents per hour to 70 and 75 cents. The request is made through the Chicago chapter of the Institute of Scrap Iron and Steel Inc. Decision will depend on the attitude of the War Labor Board.

Consumers in the Chicago district have sufficient for all current needs and inventories average close to two months' requirements. No steelmaking furnaces have been down for lack of scrap for several weeks.

In the Cleveland area receipts in the main are equal to consumption, though it is necessary at times to dip into reserves. Some scrap yard equipment, shears and baling presses, are idle for lack of men.

Cincinnati melters find incoming scrap volume slightly less than in recent weeks but are not immediately concerned as they have enough in stock for some time. Foundries are taking all offerings, though they are not seeking tonnage.

Buffalo consumers are in easy position, supply being sufficient for current requirements, with an occasional resort to reserves. The latter appear sufficient to preclude shortage during the remainder of the winter. Blast furnace items and turnings are still under the ban by consumers. Labor shortage is the great dealer problem and much more prepared scrap could be supplied if men were available.

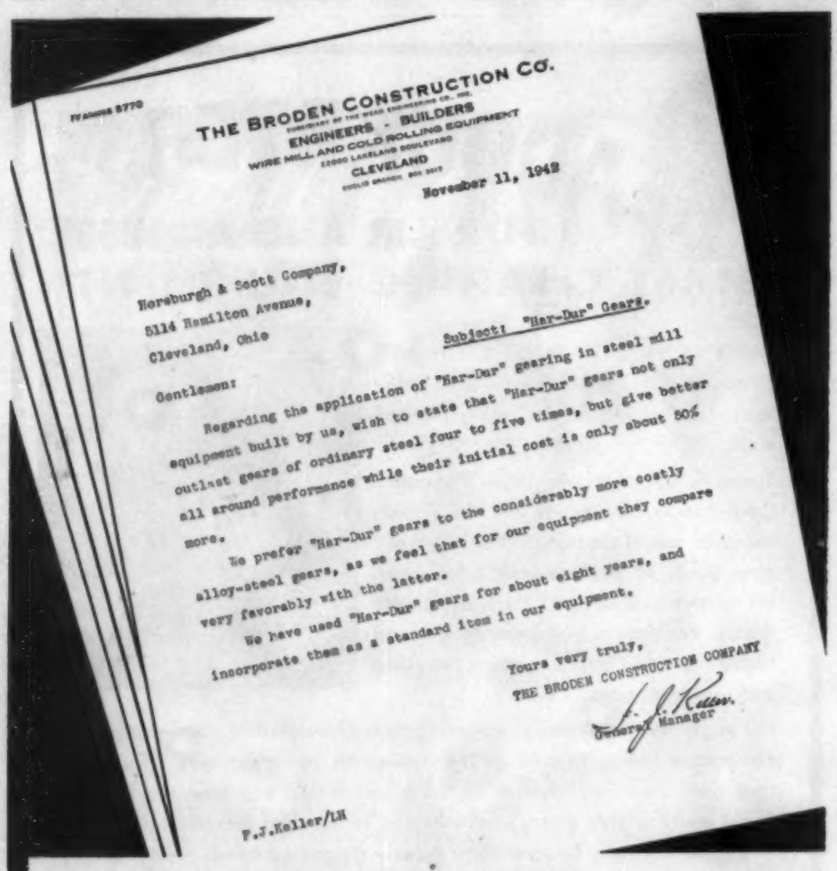
St. Louis melters find the situation easier, more scrap arriving from the Southwest. Shipments on allocations have increased. Choice grades of heavy melting steel are scarce, much being of light material. Active demand is coming out for electric furnace scrap, which is being met.

Warehouse . . .

Warehouse Prices, Page 131

Demand for hot-rolled steel products from warehouses has slackened; an exception is standard sized plates. Orders for cold-finished and alloys, notably bars, are maintained. Receipts of most hot-rolled steels are improving, but deliveries of alloys and cold-finished continue extended and supplies are tight; most alloy steel is moved into consuming channels without adding to inventories. Lower sales on hot-rolled in some instances is due to some buyers approaching the limit of PRP allotments.

Warehouses are promised more plate tonnage this month, standard widths in addition to off sizes. Of the latter some distributors are well stocked and are forced to shear them to wanted sizes and widths. Below AA-2 plate tonnage avail-


THE BRODEN CONSTRUCTION CO.
ENGINEERS - BUILDERS
WIRE MILL AND COLD ROLLING EQUIPMENT
CLEVELAND

November 11, 1942

Horsburgh & Scott Company,
5114 Hamilton Avenue,
Cleveland, Ohio

Subject: "Har-Dur" Gears.

Gentlemen:

Regarding the application of "Har-Dur" gearing in steel mill equipment built by us, wish to state that "Har-Dur" gears not only outlast gears of ordinary steel four to five times, but give better all around performance while their initial cost is only about 80% more.

We prefer "Har-Dur" gears to the considerably more costly alloy-steel gears, as we feel that for our equipment they compare very favorably with the latter.

We have used "Har-Dur" gears for about eight years, and incorporate them as a standard item in our equipment.

Yours very truly,
THE BRODEN CONSTRUCTION COMPANY
General Manager

F.J.Keller/LH

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able warehouses on approved extended ratings is limited. Jobbers with flame-cutting equipment are moving special shapes of plates in good volume. Sellers in some cases are more cautious in accepting off sizes. Small hot round bars and flats are easier, current deliveries in excess of demand, but above 1 ¾-inch in rounds and heavier flats, shipments are limited with deliveries uncertain below AA-2.

While some galvanized sheet tonnage against directives has been delivered against first quarter quotas, volume against extended ratings is light; black sheet shipments also drag against extensions and most orders are met from tonnage taken in late last quarter, which with some sellers was substantial. Demand for galvanized is light with restrictions on end-use. In hot-rolled, heavier gages are easier than light. While spotty improvement in low carbon cold-finished bar deliveries is limited to smaller sizes, alloys are as tight as ever, demand exceeding supplies. For aircraft heavy demand holds.

Semifinished . . .

Semifinished Prices, Page 128

OPA has granted permission to Wheeling Steel Corp. to use Portsmouth, O., as a basing point in sale of open-hearth sheet bars and rerolling slabs on directives or allocations by WPB. Maximum prices on such material produced at Portsmouth are $38 for sheet bars and $34 for slabs. This order puts Portsmouth on the same base as regular basing points, the price at the latter remaining at $34.

Under directives for essential steel products mills are receiving better supply of semifinished for these materials, while shortages continue occasionally in the case of lower priorities.

Steel in Europe . . .

London—(*By Cable*)—Brisk demand is encountered in Great Britain for sheets, light structurals and railroad equipment. Hematite pig iron supply is light. High grade scrap is in heavy demand but inferior qualities are dull.

Pacific Coast . . .

Seattle—Providing priorities are granted, Tacoma plans extensive water system improvements. Supt. W. A. Kunigh estimates cost of the major project at $773,583. Another project will require mains to supply the new 2000-unit Salisshan housing improvement. Increased storage and distribution lines are included. Tonnages are unstated. Alternates will probably be called for concrete pipe.

Federal Works Agency, Seattle, received bids Feb. 2 for 175 tons of 12-inch cast iron mains to serve a new housing area at Bremerton, Wash.

Seattle has awarded the contract for raising Ross dam, Skagit power project, from 1380 to 1545 feet, low joint bid of $7,144,922 being offered by General Construction Co., Seattle, J. F. Shea, San Francisco, and Morrison-Knudsen Co., Boise, Idaho. The bid includes construction and equipment.

Tacoma is considering tenders for plate surge tanks, riser and appurtenances, shaft liner and penstocks for the second Nisqually power project. Steel Tank Pipe Co., Portland, Oregon on all schedules bid $420,000, Pittsburgh-Des Moines, Chicago Bridge and Western Pipe & Steel bidding on portions of the work. Tonnages are unstated.

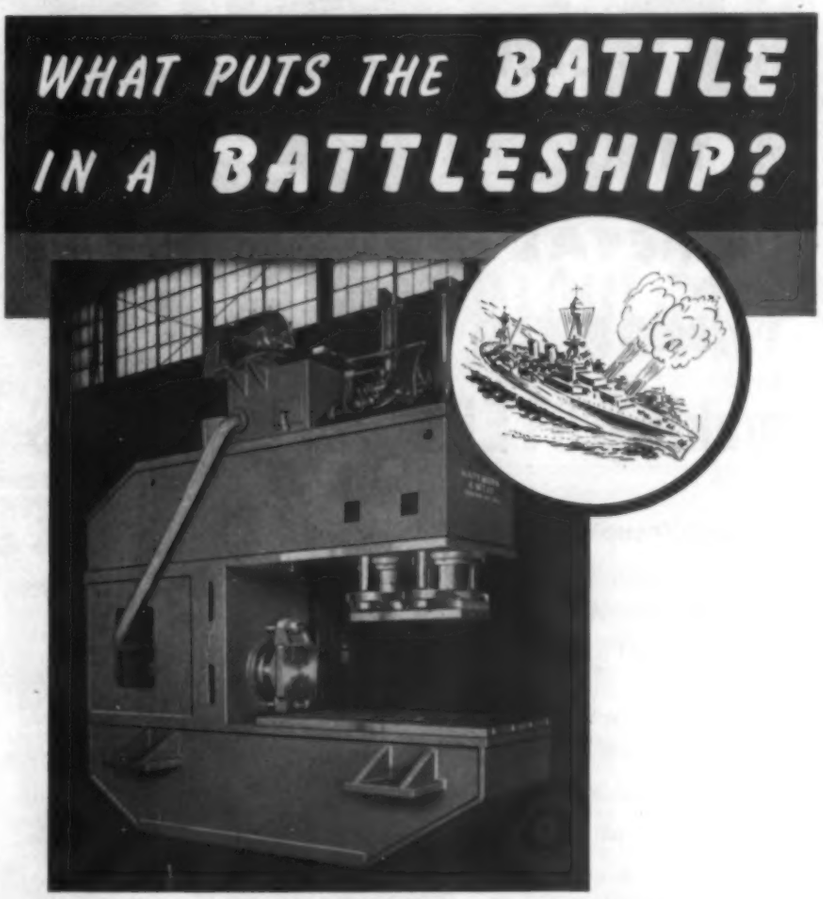
Local rolling mills are operating to capacity and have full schedules for three months. While reinforcing for production is slow, no business being placed for private construction, war work continues to absorb some tonnages. Merchant bars are strong, due to active ship construction. The prospects are that this item will be rolled in increasing tonnages through the current year. Chain plants, forging shops and deck equipment builders are using large quantities of bars. Structurals are slow, some shops being on the active lookout for new business.

Boiler and tank plants have full schedules, much of it for unstated military uses and shipyards are placing large subcontracts for vessel equipment.

Until priority regulations are eased, cast iron pipe houses look for no improvement. There is a large potential demand for these goods but deliveries cannot be promised and improvements are being postponed. Some small tonnages are moving out of warehouses.

Jobbers report better distribution under recent rulings, resulting in improved deliveries. Galvanized sheets and cold-finished bars are still extremely scarce, orders being accepted by mills subject to indefinite delivery. Movement of all items continues strong.

Navy department has announced that



BEATTY 400-TON FLANGING AND FORMING PRESS

250-Ton Capacity Hydraulic Press

IT'S ARMOR PLATE that keeps a battleship afloat. The *thicker* the plate, the *stronger* the ship . . . and the more *powerful* the PRESS required to fabricate that armored hull! Beatty-Engineered Hydraulic Presses (up to 750-ton capacities) are being used extensively in the shipbuilding, tank, railroad car, and other vital war industries. But this is just *one* of Beatty's heavy metal working machines. If your production calls for punching, shearing, coping, pressing, forming, flanging or the like, call in a Beatty engineer to help you select the *right machine* for the job. Write for complete information.

BEATTY MACHINE & MFG. COMPANY
HAMMOND, INDIANA

Nonferrous Metal Prices

Jan.	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
1-30	12.00	12.12½	11.75	52.00	52.00	6.50	6.35	8.25	15.00	14.50	35.00
Feb. 1-4	12.00	12.12½	11.75	52.00	52.00	6.50	6.35	8.25	15.00	14.50	35.00

F.o.b. mill base, cents per lb. except as specified. Copper and brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.75
Zinc, l.c.l.	13.15

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Dealers' Buying Prices
(In cents per pound, carlots)

Copper

No. 1 heavy	9.25-10.00
Light	7.25- 8.00

Brass

No. 1 composition	8.50- 9.00
Yellow brass castings	5.50- 6.00
Auto radiators	6.12½-6.62½
Red brass, borings & turnings	8.00- 8.50

Zinc

Old	4.75- 5.00
New clippings	6.00- 6.50

Aluminum

Clippings	9.75-10.25
Cast	8.75- 9.25
Pistons	8.50- 8.75
Sheet	8.75- 9.25

Lead

Heavy	4.75- 5.25
Mixed babbitt	5.25- 5.50
Electrotype shells	5.00- 5.50
Stereotype, Linotype	6.00- 6.75

Tin and Alloys

Block tin pipe	44.00-46.00
No. 1 pewter	32.00-36.00
Solder joints	7.75- 8.50

SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l.	12.50
Standard No. 12 aluminum	14.50

MAGNESIUM

(12 pound rod, 4 in. diam.)

99.8% ingot, carlots	22.50
100 lb. to carlots	24.50
Extruded sticks, ¼ to 2 lb.	
Carlots	32.00
100 lb. to carlots	34.00

How to Save

• **TIME**

• **METAL**

• **MONEY**

making STEEL SHELL CASES

If you contemplate the manufacture of steel shell cases, here are two ACP Products that will be of interest to you.

An immersion in ACP's CUPRODINE produces a dense, adherent coating of copper which substantially reduces wear on dies, cuts time over the electrolytic method, saves plating equipment, bus bars and copper electrodes.

ACP also offers—from its war-to-war experience in metal treatment and finishing—RODINE, the inhibitor used in pickling after annealing, which produces a smooth pickled surface and minimizes embrittlement. In severe draws, this latter is of great importance.

•

Other ACP Products that contribute to the war effort are: DEOXIDINE to prepare steel, aluminum and dural for painting; LITHOFORM for coating galvanized iron to hold paint; FLOSOL, an exceptional soldering flux; KEMICK for protecting metal surfaces even when heated red-hot, and other special chemicals vital to the better, cheaper, faster finishing of metals.

Whether or not there is an ACP Product available for your needs, you are invited to bring your problems here for study and recommendations on the proper chemicals and process to help you meet today's requirements. Write today outlining your problems.

AMERICAN CHEMICAL PAINT CO.
MAIN OFFICE AND WORKS
AMBLER · · · PENNA

ACP

DETROIT, MICH., 6335 Palmer Ave., E.
CANADIAN BRANCH
WALKERVILLE · · · ONT

contract for scrapping the battleship OREGON, lying at Portland, Oreg., has been awarded to William O. McKay, Seattle, and Edwin M. Ricker, San Francisco. Their offer was $50,000, subject to conditions not in the original specifications. Bids were opened Dec. 5. One condition is that the foremast and topmast shall be preserved as a memorial for the Battleship Oregon Marine Park.

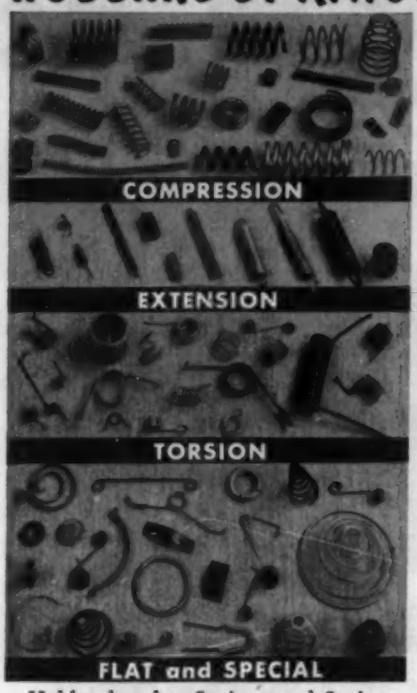
Canada . . .

Toronto, Ont. — Some easing in steel demand was reported during the past few days, reflected in fewer orders. While resumption of production at the two big steel plants is partly responsible for the improvement in steel supply, it also is reported that better deliveries are being made from the United States. As the result some Canadian interests expect better supply of some classes of steel to less essential consumers.

Local mill representatives state that while there has been a lull in orders compared with the brisk pace set a couple of weeks ago, all production of heavy steel has been covered to the end of this quarter, while on plates about 90 per cent of output is going directly to shipbuilding operations and will continue close to this rate for the duration. Surplus stocks are chiefly in wire mill products. Following a serious shortage of wire, nails, etc., in the latter part of last year, the steel controller made provision for larger allotments of steel to wire mills with the result that fairly large stocks have been established.

At the opening of the Canadian parliament last week, it was stated that Canada has attained maximum war production. It is generally conceded that the greater part of the country's war construction program has been completed and further expansion of war industry is not under consideration. However, with war industry at maximum production, steel and other raw materials requirements this year are expected

HUBBARD SPRINGS



Extension spring with raised elongated hook end.

Torsion spring with one offset hook end and one straight end

Torsion spring with special hook end.

Torsion spring with both ends special.

Hubbard makes Springs and Spring Parts in all types, forms and shapes, and in all kinds of metals, for manufacturers' products and specific needs.

ALSO—SMALL STAMPINGS AND WIRE FORMS

M. D. HUBBARD SPRING CO.

702 Central Ave., Pontiac, Mich.

The COMPARITOL BY SCHERR

A TIME AND MONEY SAVING INSPECTION INSTRUMENT FOR EVERY SHOP ENGAGED IN MASS PRODUCTION

The Scherr Comparitol proves one of the most versatile instruments a shop might possess. Close tolerance inspections are easily made minus the human element of "feel" and skill. It reduces the inspection of finished parts in quantity to a fast, fool-proof *visual* operation, assuring interchangeability and trouble-free assembly. The Comparitol makes it easy to give all shop tools and gages regular inspections for accuracy and wear. The speeded-up inspections which the Comparitol affords, facilitates production and lowers costs . . . . A fully illustrated and descriptive bulletin—listing complete specifications will be mailed upon request.

GEORGE SCHERR CO., Inc.

128 LAFAYETTE STREET • NEW YORK, N. Y.

INSPECT REGULARLY!

Don't neglect your **WRIGHT HOISTS.** Make them last longer by regular and proper maintenance. Here are a few suggestions:

Put the grease gun to work! A **WRIGHT HOIST** needs thorough lubrication once a month. Keep the load chain well lubricated, too.

Don't overload your hoist. While **WRIGHTS** are famous for their ability to stand abuse, this is no time to abuse machinery. Overloading results in a stretched chain which cannot seat itself properly in sheave pockets, thus accelerating wear.

Watch the load hook. WRIGHT hooks, drop-forged from special steel, give visible warning of overloading by slowly opening. Don't continue to use hooks that have stretched.

Inspect your hoists regularly. Remember: where properly maintained, **WRIGHT HOISTS** have given continuous, trouble-free service for 20 to 25 years.

In Business for Your Safety

WRIGHT MANUFACTURING DIVISION

York, Pa., Chicago, San Francisco New York

AMERICAN CHAIN & CABLE COMPANY, INC.

BRIDGEPORT, CONNECTICUT

to exceed those of 1942 by approximately 25 per cent, but recent deliveries show no indication of such a large increase in demand. On the contrary Canada has lost, through strikes this year, approximately 150,000 tons of steel which would be sorely needed to maintain maximum war production. Sharp curtailment in structural steel demand, however, is throwing much steel into other industrial channels.

Demand for plates continues in excess of domestic production, and all Canadian producers are assured of a market for their full output to the end of the war at least.

Orders for sheets have declined but no actual slowing in consumption has been reported. The decline in sales is due to the fact that most users have already made known requirements for this quarter.

While there was some easing in demand for merchant bars mill representatives report heavy backlogs, and state that on current orders delivery dates still are uncertain, ranging from three to four months.

Demand is absorbing all available merchant pig iron and some melters complain of shortage. Sales for the past week rose to approximately 10,000 tons, while deliveries held to around 7000 tons.

Trading in scrap iron and steel is gradually returning to normal. While no receipts are reported from the rural districts, offerings from local sources of supply have increased and dealers state that incoming scrap is holding at about 50 per cent of consumption. With steel mills now swinging to higher steel production scrap consumption is expanding, causing heavy withdrawals from stock.

Intelligent Co-operation Required for CMP's Success

(*Concluded from Page* 65)

to obtain controlled materials. Essential industries, in purchasing supplies, will place on their orders the symbol "MRO" together with their identification number and a certification stating that materials ordered are required for essential maintenance, repair or operating purposes and that the order is placed in compliance with CMP regulations. Such orders will receive the same preference treatment as any CMP order bearing an allotment number.

In obtaining other supplies preference ratings will be used. Group I industries, comprising war plants and makers of basic industrial equipment, will be assigned AA-1 rating; Group II, including other essential industries, will use AA-2X; all other industries use A-10.

Limitations will be specified on the amount of supplies a consumer may purchase.

CMP "Substantially Simplified"; Much Paperwork Eliminated

Substantial simplification of the Controlled Materials Plan has been announced by Ferdinand Eberstadt, WPB program vice chairman.

It reduces the amount of paperwork and accounting required of manufacturers, and particularly those producing Class A products. Allotments of controlled materials—steel, copper and aluminum—will be made on a quarterly basis instead of monthly as previously announced, thus reducing the number of accounting entries by two-thirds.

Total number of programs for which accounts will be required has also been reduced to less than 100 from several times that number. This will further simplify the internal bookkeeping of users of controlled materials.

Simplification will affect accounting practices, under the Controlled Materials Plan, but do not change the requirements for applications for allotments of controlled materials which are now being prepared by manufacturers. These applications must be prepared and submitted in accordance with instructions already given.

Special accounting manuals giving simple debit and credit methods for keeping records of allotments and their use are being prepared by WPB to assist manufacturers to set up their bookkeeping procedures under the plan.

Young by the count of his years, but matured by the weight of the fears he has choked in the vise of his valor, this boy—a little homesick perhaps in his lonely vigil—is the symbol of the millions who will see their first star-shell.

What is he thinking about, out there in the sullen stillness of his post?

Whatever it is, you may be sure it has something to do with the life, the people, the plans he left back here. They are a mental magnet to his thoughts—revised occasionally as he ponders what he will come back to.

If the pace of production has been maintained, if enough bonds have been bought, if more than words has been devoted to post-war plans, he will come back to feel his contribution has been worthwhile.

It is up to us, here and now, to discharge our obligation to him by producing more, by investing in bonds, by planning for the pent-up, unrationed needs of that day.

If new special-purpose machines are part of your post-war plans, you will want to send for a copy of "Facilities."

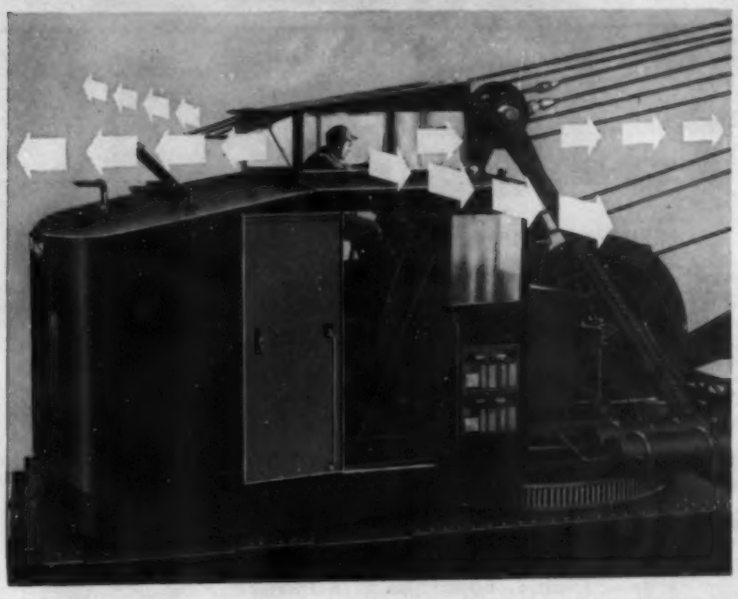
Designers and Builders of Intricate, Automatic Precision Machines

32 YEARS' EXPERIENCE

FIDELITY MACHINE COMPANY

3908-18 FRANKFORD AVENUE, PHILADELPHIA, PA.

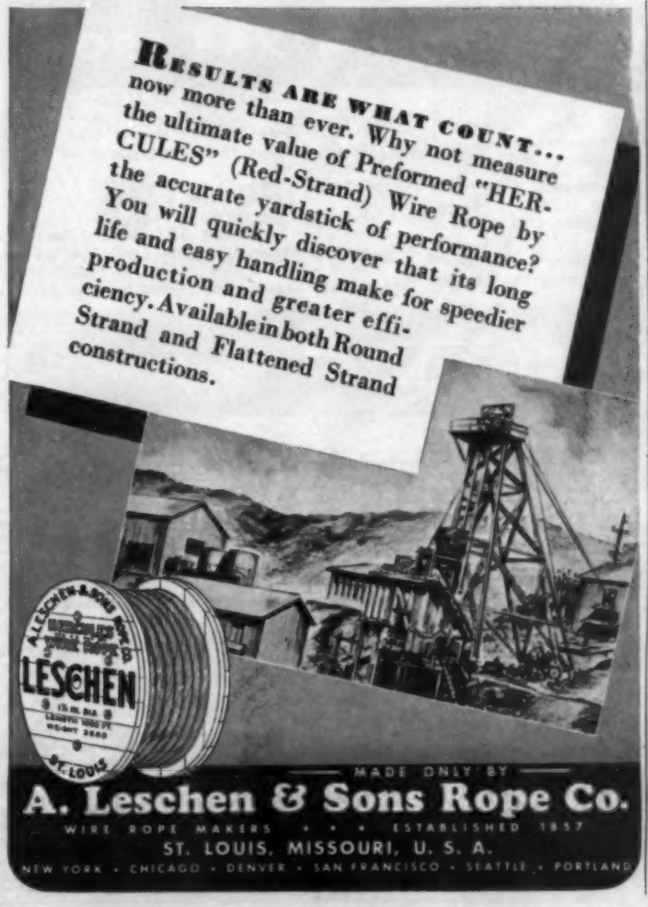
You'd want to see in every direction, too, if you operated your company's cranes!



When you're swinging up to 40 tons of heavy material on the end of a fifty-foot crane-boom you want to see what you're doing. That's why the Monitor-type cab on I.B. Cranes is such an important factor in speeding up material handling. For the operator can see clearly in every direction. No blind spots cut off even a segment of his 360° range of vision. Besides visibility, the I.B. Monitor-type cab provides better ventilation, less noise, and less heat. Controls are conveniently placed for handy operation.

From undercarriage to boom-tip Industrial Brownhoist Cranes are designed and built to increase production in material handling whether with magnet, hook or bucket. — Industrial Brownhoist Corp., Bay City, Mich. District Offices: New York, Philadelphia, Pittsburgh, Cleveland and Chicago.

INDUSTRIAL BROWNHOIST BUILDS BETTER CRANES


RESULTS ARE WHAT COUNT... now more than ever. Why not measure the ultimate value of Preformed "HERCULES" (Red-Strand) Wire Rope by the accurate yardstick of performance? You will quickly discover that its long life and easy handling make for speedier production and greater efficiency. Available in both Round Strand and Flattened Strand constructions.
LESCHEN
MADE ONLY BY
A. Leschen & Sons Rope Co.
WIRE ROPE MAKERS • • • ESTABLISHED 1857
ST. LOUIS, MISSOURI, U. S. A.
NEW YORK • CHICAGO • DENVER • SAN FRANCISCO • SEATTLE • PORTLAND

NATIONAL ROLLS

The Base of Munitions Production

Steel production must increase and NATIONAL ROLLS are doing their share to insure continuance of the present rapid pace.

Carefully planned and compounded from the outset for the work they are intended to do, then cast at the right heat, and finally finished to precision on lathe and grinder, they are well prepared to do their share in defeating our enemies.

THE NATIONAL ROLL & FOUNDRY CO.
ROLLING MILL EQUIPMENT
BAIRD WATER COOLED STANDINGS · HEAVY IRON AND STEEL CASTINGS
CHILLED AND SAND ROLLS · SPECIAL IRON ALLOY ROLLS
AVONMORE, PA.

NEW BUSINESS

Plant Expansion, Construction and Enterprise, Government Inquiries, Sub-Contract Opportunities, Contracts Placed and Pending

SUB-CONTRACT OPPORTUNITIES

Data on subcontract work are issued by regional offices of the War Production Board. Contact either the office issuing the data or your nearest field office. Write, don't telephone, and mention key letters and numbers appearing before each item to assure prompt attention and avoid delay.

Boston office, Contract Distribution Branch of WPB, 17 Court street, is seeking contractors for the following:

SC-59: Hydraulic press with furnace adjacent, 300 to 1800 tons. Minimum bolster area 4 x 8 feet to 4 x 12 feet. Material furnished by prime contractor. Reference, 1-A-519.

SC-60: Single-spindle automatic screw machine work for machines having 2¼-inch diameter bar capacity. Material, cold-rolled hex steel, supplied by prime contractor. Quantity, 100,000, at rate of 7500 per week. Reference, 1-E-20.

SC-61: Single-spindle automatic or hand screw machine work for machines having 1¾ to 3-inch diameter bar capacity. Five sizes socket wrenches with double hex 12-point opening, 1⅛ to 2⅝-inch inside diameter. Material, chrome-vanadium steel. Quantity, 2600 of each size. Wanted as soon as possible.

SC-62: Steel foundry facilities for producing tread shoe steel castings. Approximate size, 9 x 17 x 14 inches. Weight, 38 pounds. Material, yield point 50,000 pounds p.s.i., tensile strength 80,000 pounds p.s.i. Annealed. Quantity, 10,000, 500 weekly. Reference, 1-A-524.

Chicago office, Contract Distribution Branch of WPB, 226 West Jackson boulevard, is seeking contractors for the following:

Elastic Stop Nut Corp., 2330 Vauxhall road, Union, N. J., attention E. G. Wibom. Priority AA-1. three items of stop nut blanks. Can be divided between several contractors. Material, steel, B-1112, C-1118, C-1137, furnished by contractor. Either single or multiple-spindle automatic screw machines may be used. Will consider subcontractors anywhere. Production requirements 20 million per week. Dimensions, ⅜ x ⅛-inch, ½ x ¼-inch and ½ x ⅝-inch.

Electrimatic division of Simoniz Co., 2100 Indiana avenue, Chicago, attention C. H. Simmons. Priority AA-1. Three items, piston, retainer and valve parts for naval work. Delivery to start March 1, 1943. Contractor will supply material. Equipment, turret lathe, 1⅛-inch bar capacity; external cylinder plain grinder, 6 x 18 inches; hand milling machine, 6 x 14 inches T. T.

Ellis Drier Co., 2444 North Crawford avenue, Chicago, attention H. Johnson. Priority AA-3. Large steel parts for extractors, 42 x 20 and 52 x 20 inches. Quantity, 60 of each size. Contractors in Chicago preferred. Contractor supplies material only. Equipment, vertical boring mills, 42 and 52-inch. Tolerance, .002.

Federal Electric Co., 8700 South State street, Chicago, attention W. F. Moorhouse. Priority AA-1. Bars to be milled and drilled. Contractor supplies material. Quantity, 1750. Size, 1 x 17 inches. Equipment, plain No. 2 horizontal milling machine, No. 1 Morse single-spindle sensitive drill.

Foster Wheeler Corp., Dansville, N. Y., attention Mr. Westfall. Hydraulic press with furnace adjacent, 300 to 1800 tons. Minimum bolster area 4 x 8 feet to 4 x 12 feet. Will be used for squaring 10-foot pipes 9 inches in diameter, one-inch wall, for boiler heads. Material will be furnished.

General Electric Co., 1635 Broadway, Fort Wayne, Ind., attention Robert E. Bangert. Priority AA-1. Covers hobbing of spline shaft. Hob must be 1½ inches in diameter. Contractor will supply material. Quantity, 600. Dimensions, 1⅝ x 18 inches. Material, alloy steel. Equipment, six-inch universal gear hobber.

Industrial Wire Cloth Products Corp., Wayne, Mich., attention G. Pushelburg. Priority, AA-1. Top fitting. Material, cold-drawn steel SAE 1112, B-1112 or X-1112. Quantity, 30,000, with 2000 pieces beginning April 1 and 5000 pieces per month thereafter. Contractor can furnish some special gages. Equipment, 1⅝-inch bar capacity turret lathe, tapping machine with lead screw for cutting threads.

Liquid Carbonic Co., 3100 South Kedzie avenue, Chicago, attention H. Lampert. Priority AA-1. Platform casting and bracket. Quantity, 12 of first and 60 of second. Dimensions, 33 x 59 inches and 11 x 74 inches, respectively. Material, cast steel. Equipment, 4-inch and 5-inch spindle boring mills. Tolerance, .005.

Wheelco Instrument Co., Harrison and Peoria streets, Chicago, attention William G. Flynn. Priority AA-1. Hub bodies, 100 each of two sizes, ½ x 1⅛-inch and ⅝ x 1 inch. Contractor supplies material, cold-rolled steel. Equipment, 1⅛-inch bar capacity turret lathes.

Stewart-Warner Corp., 1828 Diversey Parkway, Chicago, attention J. R. Brandenburg. Priority AA-1. Item 1 is packing washer ¼ x 2½ inches, cold-rolled steel, 600 pieces; item 2 a mounting ring, bronze, ½ x 3½ inches, 1750 pieces; item 3 a flange ½ x 3 inches, 1750 pieces. Equipment, 1 and 2½-inch bar capacity turret lathes, ⅞-inch dr. cap. two-spindle bench drill. Contractor will aid in furnishing material and special tools.

STRUCTURAL SHAPES . . .

SHAPE CONTRACTS PLACED

1200 tons, sinter plant, Aluminum Co. of America, East St. Louis, Ill., Defense Plant Corp. financed, to Stupp Bros. Bridge & Iron Co., St. Louis county, Mo.

1200 tons, sinter plant, Aluminum Co. of America, Mobile, Ala., Defense Plant Corp. financed, to Stupp Bros. Bridge & Iron Co., St. Louis county, Mo.

200 tons, bridges, 125 tons, Newark, N. J., to [illegible] Inc., Hillside, N. J., and 75 tons, Harrison, N. J., to Phoenix Bridge Co., Phoenixille, Pa.

120 tons, bridge repairs for Pennsylvania railroad in Ohio, Bethlehem Steel Co., Bethlehem, Pa.

100 tons or more, bridge cranes, Boston, South Boston, Washington, Charleston and mine experimental station, Pt. Patience, Md., to Harnischfeger Corp., Milwaukee, $99,170; spec. 10,965, bureau of yards and docks.

SHAPE CONTRACTS PENDING

100 tons or more, coaster gates for main unit penstocks, Shasta dam, bureau of reclamation, Denver, American Bridge Co., Denver, low, $80,354, spec. 1053.

REINFORCING BARS . . .

REINFORCING STEEL PENDING

Unstated, raising Ross dam, Skagit power project, Seattle; general contract to General Construction Co., J. F. Shea and Morrison-Knudsen Co., joint low at $7,144,922.

PLATES . . .

PLATE CONTRACTS PENDING

Unstated, surge tanks, penstocks and other equipment, second Nisqually power project; Steel Tank & Pipe Co., Portland, Oreg., sole complete bid at $420,000.

PIPE . . .

STEEL PIPE PLACED

500 tons, large diameter welded pipe for Atlantic Refining Co., for use in East and in Texas.

STEEL PIPE PENDING

Unstated, 10,952 feet 54-inch, 200 feet 52-inch, 2490 feet 42-inch, 1040 feet 30-inch steel pipe, Tacoma, Wash., $773,583 water system improvement; plans prepared, bids not called.

CAST PIPE AWARDS

175 tons, 12-inch, Bremerton, Wash. extension; bids to Federal Works Agency, Seattle, Feb. 2.

RAILS, CARS . . .

CAR ORDERS PLACED

Atchison, Topeka & Santa Fe, 200 seventy-ton gondolas, released to Pullman-Standard Car Mfg. Co., Chicago, under approval of WPB.

Northern Pacific, 300 fifty-ton flat cars, released to American Car & Foundry Co., through approval of WPB.

CAR ORDERS PENDING

Chicago & Northwestern, 250 seventy-ton ore cars; bids asked.

LOCOMOTIVES PLACED

Nashville, Chattanooga & St. Louis, ten 4-8-4 freight locomotives, released to American Locomotive Co., New York, under authorization of WPB.

Downs HANDLING EQUIPMENT

HORIZONTAL PLATE HOOKS may be used in sets of either two or four. Will handle one or more plates at each lift. They are time and labor savers for fast loading or unloading when plates are to be stacked in the flat position.

SAFETY PLATE GRIPS with either rigid or loose guide loops will hold with a positive grip in all positions. Used for handling vertical plates, they are also safe for upending or turning over horizontal plates or assemblies.

DOWNS RAIL TONGS built for safe and economical handling of railroad rails of all sizes and weights. Two-ton capacity with jaw openings of 3" for rails up to 100 lbs. ASCE. Three-ton capacity with jaw openings of 4½" for the heaviest rails.

DOWNS CRANE & HOIST CO.
540 W. Vernon Ave., Los Angeles, Calif.

PRODUCTION FLOWS Smoother WITH *AMERICAN OLD FAITHFUL CRAYONS

Why take chances on so small a thing as a marking crayon when production is so important today? One illegible mark may cost many times the price of AMERICAN OLD FAITHFUL MARKING CRAYONS, made especially for the job you are doing. Hot steel, cold steel, practically every material used in Industry today has an AMERICAN INDUSTRIAL CRAYON made especially for it. Use the crayon that is designed for that job in your plant!

Send for the AMERICAN INDUSTRIAL CRAYON GUIDE today!

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CORE BAKING OVENS

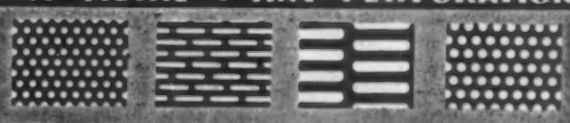
Standard, simplified, compact. Gas, coal-wood, or oil fired. Deliveries on high priorities 2 or 3 days after receipt of order. Contact your foundry supply house or write:

THE G. S. BLODGETT COMPANY, INC.
53 MAPLE STREET, BURLINGTON, VERMONT

BY BLODGETT

SCREENS of Perforated Metal

ANY METAL • ANY PERFORATION



The Harrington & King PERFORATING CO.

5634 Fillmore St., Chicago, Ill.
New York Office—114 Liberty St.

HENDRICK PERFORATED METALS

Hendrick follows your instructions accurately, whether for a simple machine guard, or an intricate small-hole punching in stainless steel, or other corrosion resisting material.

HENDRICK MANUFACTURING CO.
37 Dundaff Street Carbondale, Pa.
Sales Offices in Principal Cities
Please Consult Telephone Directory
Manufacturers of Mitco Open Steel Flooring; Elevator Buckets; Light and Heavy Steel Plate Construction

THE SIMONDS GEAR & MFG. CO.

25TH STREET, PITTSBURGH, PA.

To all gear users:

1942 marks our 50th year in the gear business; this means that our quality gears are now backed by half a century of experience in the manufacture of all types of dependable gears—spur, bevel, mitre, worm, rack, internal, etc. If we haven't just the type you need, we can make it—and in a hurry, too!

CONSTRUCTION AND ENTERPRISE

ILLINOIS

CHICAGO—United Precision Products, 4607 West Huron street, has acquired and moved into a new plant at 3524 West Belmont avenue.

CHICAGO—Chicago Bridge & Iron Co., 1305 West 105th street, which recently completed a plant near Seneca, Ill., also is making some additions to its plant capacity here.

CHICAGO—Skilsaw Inc., 5033 North Elston avenue, is making another expansion to its plant.

CHICAGO—Automotive Transportation Co., 101 West Eighty-seventh street, has completed an addition to its plant.

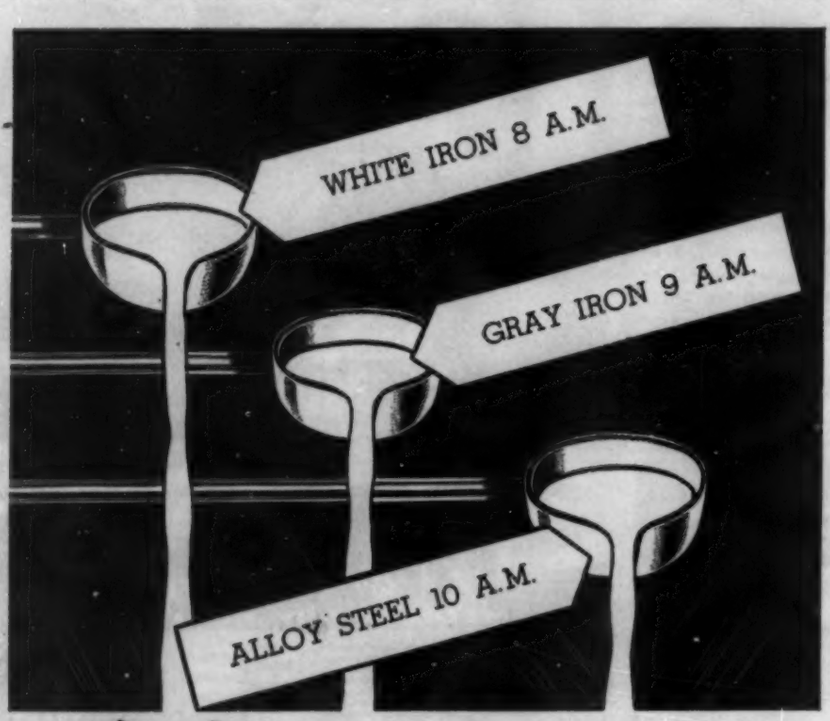
CHICAGO—Olson & Tilgner Mfg. Co., 2280 North Elston avenue, has purchased another building at 2278 North Elston avenue.

CHICAGO—Stewart-Warner Corp., 1228 West Diversey, is undertaking another addition to its plant to increase production facilities.

CHICAGO—Armstrong-Bray & Co., 5366 North Northwest highway, is preparing to undertake further expansion of its manufacturing facilities.

CHICAGO—J. W. Droll Co., 351 East Ohio street, has purchased building at Jackson boulevard and Sangamon street, containing 60,000 square feet of space.

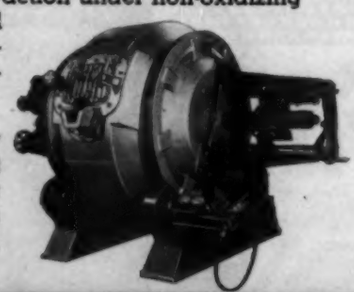
CHICAGO—Master Finishers Inc., 2427 South Prairie avenue, has acquired building at 2415 South Prairie avenue, doubling its plant capacity.



all three POURED IN THE SAME MORNING FROM A DETROIT ROCKING ELECTRIC FURNACE . . .

Detroit Rocking Electric Furnaces are used in jobbing and production foundries for melting a variety of mixtures throughout the day.

Because of their automatic stirring action under non-oxidizing conditions, and the precise control of time, temperature and composition, Detroit Furnaces assure superior metallurgical results.



For versatility, speed, and low metal losses you simply cannot beat the Detroit Rocking Electric Furnace for melting either ferrous or non-ferrous metals and alloys.

DETROIT ELECTRIC FURNACE DIVISION
KUHLMAN ELECTRIC COMPANY • BAY CITY MICHIGAN

CHICAGO—Hinsdale Mfg. Co., 1728 West Walnut, maker of small tools, is building an addition to its plant.

CHICAGO—Crane Co., 4100 South Kedzie avenue, is making further additions to its plant. Graham, Anderson, Probst & White, 80 East Jackson boulevard, architect.

CHICAGO—Runzel Cord & Wire Co., 4727 West Montrose avenue, will enlarge its plant because of increasing war business. E. W. Johansen, 3853 North Keeler avenue, general contractor.

CHICAGO—Ohmite Mfg. Co., 4835 West Flournoy, is doubling size of its plant. Alfred S. Alschuler and R. N. Friedman, 28 East Jackson boulevard, architects.

CHICAGO—Affiliated Engineering Co. is establishing a branch of its Detroit main plant here to serve particularly the new Dodge-Chicago plant of Chrysler Corp. The company will operate a precision machine shop.

CHICAGO—Lindberg Engineering Co., 2450 West Hubbard street, is making additional expansions to its plant.

CHICAGO—Garden City Foundry Co., 7219 North Wolcott avenue, has been incorporated with 1500 shares of common stock by Joseph V. Shanley, G. A. Shanley and Francis Shanley, to operate general foundry and machine shop business. Correspondent: Henderson & Mjelde, First National Bank building, Stoughton, Wis.

CICERO, ILL.—American Phenolic Corp., 1830 South Fifty-fourth street, has plans by Burnham & Hammond, 160 North LaSalle street, Chicago, for factory.

MASSACHUSETTS

NORWOOD, MASS. — Associated Factory Mutual Research Corp., Pleasant street, has let contract for boiler plant and five test buildings to Horn Bros. Inc., 23 Miner street, Boston, and Babcock Davis Corp., 474 Dorchester avenue, South Boston. Estimated cost $40,000.

CONNECTICUT

NEW CANAAN, CONN.—Robert G. Roles, Park place, has been awarded contract by industrial company for factory-office building, estimated to cost $40,000.

NEW JERSEY

BELLEVILLE, N. J.—Walter Kidde Co., 140 Cedar street, New York, will build top story addition to its plant here. Estimated cost $53,000. J. F. Yewell, 10 East Fortieth street, New York, architect.

JERSEY CITY, N. J.—Continental Can Co., 11 West Washington street, Chicago, has awarded contract for four-story factory, also plant repairs, to Austin Co., 19 Rector street, New York. Cost $200,000.

OHIO

CLEVELAND—E. C. Kitzell & Sons, makers of diamond faced cutting tools, are planning addition to plant at 6090 Denison avenue.

CLEVELAND—Standard Alloy Co., Paul G. Lutz, general manager, is starting addition to factory at 1679 Collamer, East Cleveland.

KENT, O.—Davey Compressor Co., 266 North Water street, has acquired two buildings and will remodel and repair them for additional plant units.

LORAIN, O.—Thew Shovel Co., East Twenty-eighth street and Fulton road, will make plant improvements, including alteration to office building, new acetylene gas plant and control house.

MANSFIELD, O.—Hartan Electric Co. plans erection of plant costing approximately $200,000.

PENNSYLVANIA

CONSHOHOCKEN, PA.—Alan Wood Steel Co., Conshohocken, will spend approximately $600,000 for plant in Morris county, New Jersey.

PITTSBURGH—A. M. Byers Co., L. F. Rains, president, Clark building, has awarded contracts for plant expansion and two additions.

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MARYLAND

BALTIMORE—Davis Construction Co., 9 West Chase street, has contract for boiler house at 1655 Warner street for Gibson & Kirk Co.

KENTUCKY

LAWRENCEBURG, KY.—Defense Plant Corp. has increased its contract with Bonds Mill Distilling Co., Lawrenceburg, to provide equipment for plant in Kentucky.

OWENSBORO, KY.—Ken-Rad Tube & Lamp Corp., 316 East Ninth street, Owensboro, plans plant to manufacture radio and other equipment.

TENNESSEE

ROCKWOOD, TENN.—Products Corp., care of C. McFarlin, president, American National Bank building, Nashville, Tenn., will spend about $75,000 for improving buildings and facilities here.

SOUTH CAROLINA

LYMAN, S. C.—C. M. Guest & Sons, Anderson, S. C., has contract for filter plant for Pacific Mills, Lyman, to cost $130,000. Wiedeman & Singleton, engineers, C. & S. Bank building, Atlanta, Ga.

LOUISIANA

VILLE PLATTE, LA.—Cabot Carbon Co., Boston, will begin construction soon of carbon black plant here, entire output of which will go into manufacture of synthetic rubber. Reno Stinson, assistant district superintendent for Cabot Carbon Co.

MISSOURI

ST. LOUIS—James H. Bright Construction & Building Co., 1259 North Kingshighway, has contract for building for Southern Equipment Co.

ST. LOUIS—Defense Plant Corp. has authorized an increase in contract with Monsanto Chemical Co., St. Louis, for additional plant facilities in Texas.

ST. LOUIS—Porbeck Mfg. Co., manufacturer of core and industrial ovens, has purchased a plant at 2600 North Ninth street, and will occupy it about Feb. 1. New quarters will provide enlarged manufacturing facilities.

OKLAHOMA

TULSA, OKLA.—Manning, Maxwell & Moore Inc., Bridgeport, Conn., will establish plant at Thirteenth place, Lewis and Katy tracks, here, for manufacture of oil field gages.

TEXAS

GARLAND, TEX.—Continental Motors Corp. will take bids soon on plant unit costing over $40,000. Gieb, LaRoche, Dahl & Chappell, Texas Bank building, Dallas, Tex., architects.

CALIFORNIA

ALHAMBRA, CALIF.—Kay Brunner Steel Products is building an addition to its factory at 999 Meridian avenue.

HUNTINGTON PARK, CALIF.—Lane-Wells Co. is erecting an addition to factory at 5620 Soto street, Los Angeles.

LOS ANGELES—Processing Machinery Corp. has been organized with capital of $450,000, by W. D. O'Morrow, Los Angeles; R. L. Know, Pomona, Calif.; and H. H. Damerel, Covina, Calif. The new corporation is represented by Faries, McDowell, Subway Terminal building, Los Angeles.

LOS ANGELES—A new extension of an aircraft factory just completed will be erected in the Los Angeles area for Douglas Aircraft Co., Santa Monica, Calif. Extension will consist of three factory buildings and three lean-to buildings and will cost $250,000. Edward Cray Taylor and Ellis Wing Taylor, 803 West Third street, Los Angeles, are architects, and O. J. Senum, 2646 Twenty-ninth street, Santa Monica, is general contractor.

OAKLAND, CALIF.—Monarch Steel Products Co., 731 Carlton street, Berkeley, has let contract for corrugated iron factory at 1930 Cypress street. Estimated cost $50,000. K. Theill, 580 Market street, San Francisco, engineer.

WASHINGTON

SEATTLE—Seattle Brass Co., 400 Seventh avenue South, has awarded general contract for plant alterations and improvements.

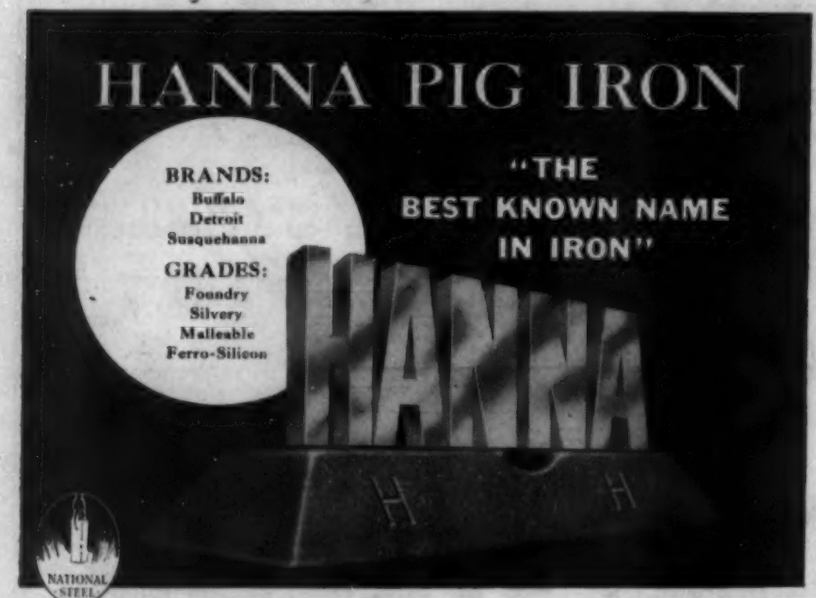
CANADA

WINNIPEG, MAN.—Western Auto & Truck Body Works Ltd., 702 Broadway avenue, has started work on plant addition and will install equipment to cost about $45,000.

HAMILTON, ONT.—Hamilton Bridge Co. Ltd., Bay street North, has received bids and will let contracts immediately for plant addition to cost about $10,000. Plans by Prack & Prack, architects.

PORT HOPE, ONT.—Eldorado Gold Mines Ltd., 80 King street West, Toronto, has given general contract to Combustion Engineering Corp. Ltd., 1010 St. Catharine street West, Montreal, for plant addition to cost about $85,000.

ST. CATHARINES, ONT.—McKinnon Industries Ltd., Ontario street, has plans and will let contracts soon for plant addition to cost about $12,000. A. E. Nicholson, 42 Queen street, architect.



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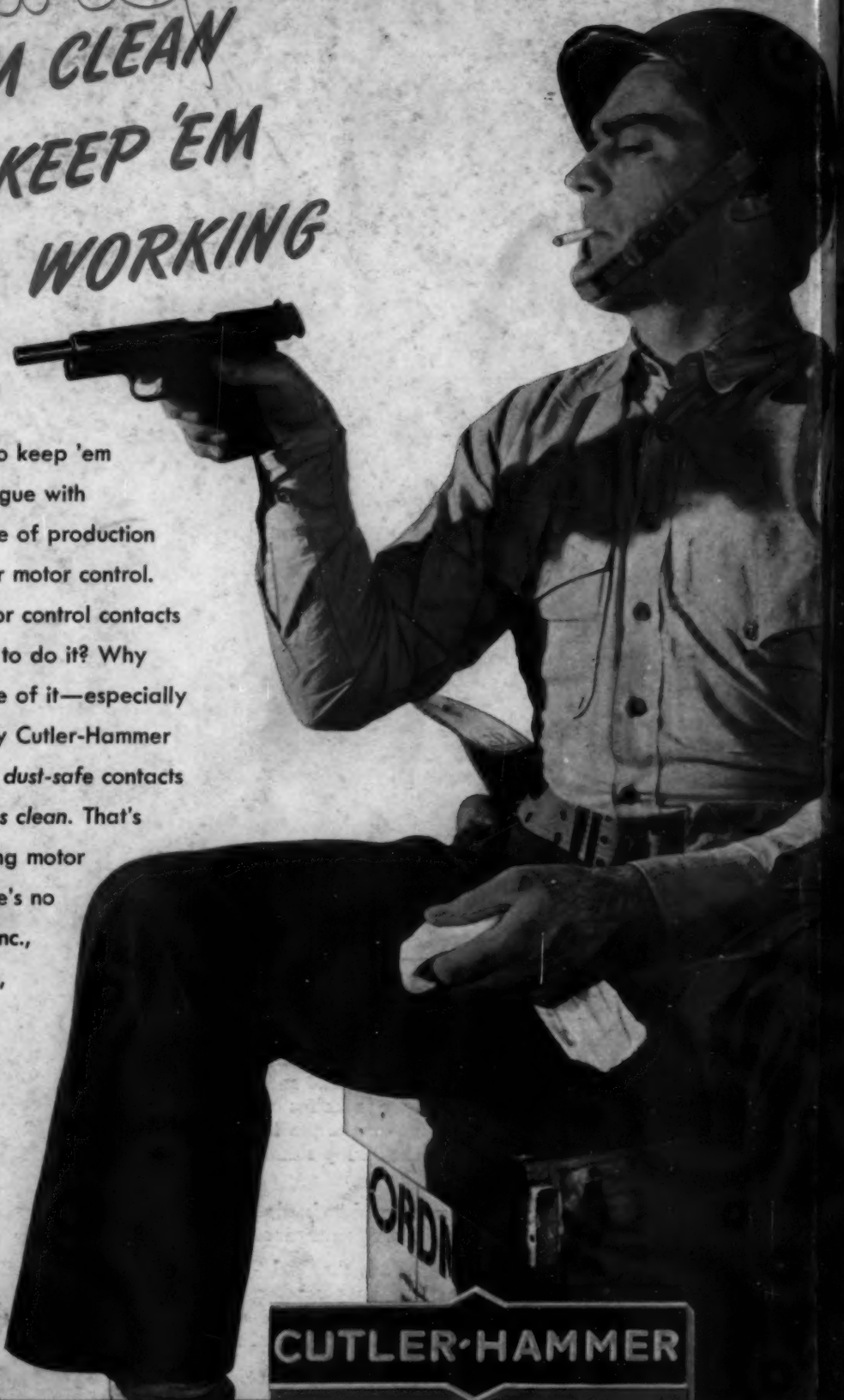

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